- Newsprint production costs
- New markets for paper
- Technology and trade
- New applications of honeycomb
- Uses of electronic photoswitches

The Paper Industry

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High note in EVAPORATING economy!

Get up to 6 pounds of vapor from 1 pound of steam with Swenson Septuple Effect Evaporators

Here's how to hit "high E" in evaporating economy! With seven Swenson Evaporator effects you boil off 5.7 to 6 pounds of vapor for every pound of steam that enters. You save fuel and steam plus condensing water as well, thus contributing to lower production costs per ton of pulp. If you presently use less than septuple evaporation, your existing evaporator equipment can be changed to septuple effect . . . with a gain in steam economy.

Get complete information on multi-stage evaporation economy. Write today for Bulletin E-100.

SWENSON EVAPORATOR COMPANY
15653 Lathrop Avenue, Harvey, Illinois

Multiple Effect Economy*

	QUINTUPLE	SEXTUPLE	SEPTUPLE
ONE POUND OF STEAM GIVES	3.7 to 3.9 pounds vapor	4.8 to 5 pounds vapor	5.7 to 6 pounds vapor

*Results will vary with feed and pressure conditions.

SWENSON
Proved Engineering for the Process Industries
SINCE 1889

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Pulp Washers • Evaporators
Filters • Digester Blow Condensers
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Early 18th Century Chinese Snuff Pot or Bottle with Yang-Yin symbol above a boar. From collection of Mrs. H. F. D. Davis.

This symbol (Yang-Yin) represents T'ai-chi, the old Chinese *Ultimate Principle*, and as such, *perfection*. As the Asten-Hill trademark it symbolizes the *best* in paper mill DRYER FELTS.

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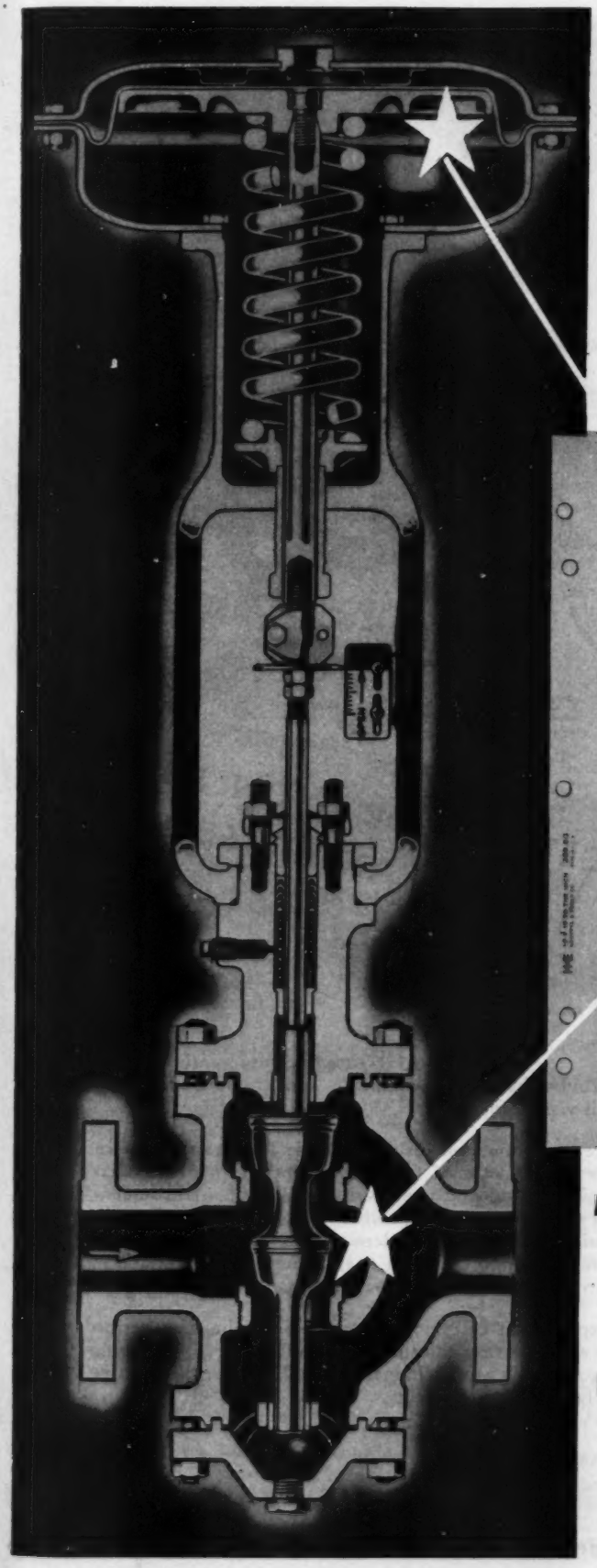

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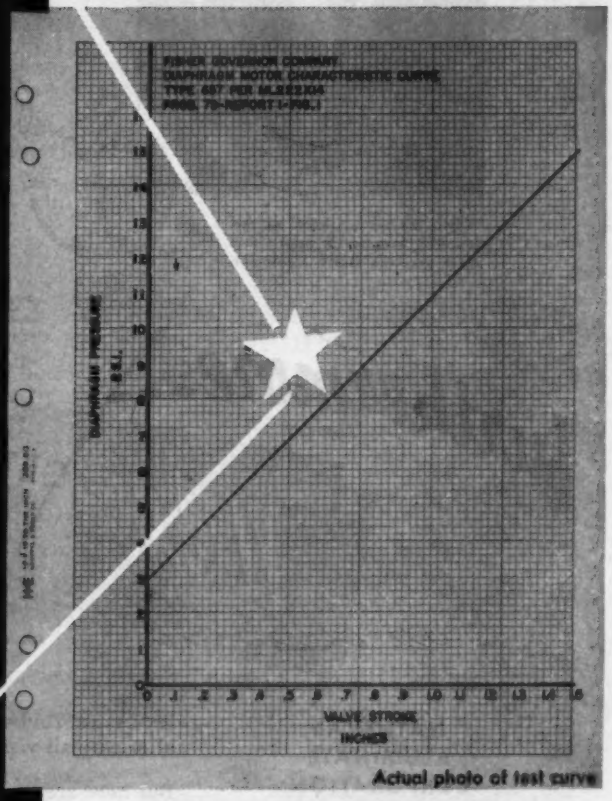
DIAPHRAGM MOTOR VALVES



Actual photo of test curve

NEW SUPER STRUCTURE PROVIDES LINEARITY OF OPERATION

Special molded diaphragm, in combination with deep casing, provides constant diaphragm effective area. Resultant linear relationship between input signal and inner valve position makes *flow versus diaphragm pressure* characteristic of control valve identical to *flow versus lift* characteristic.

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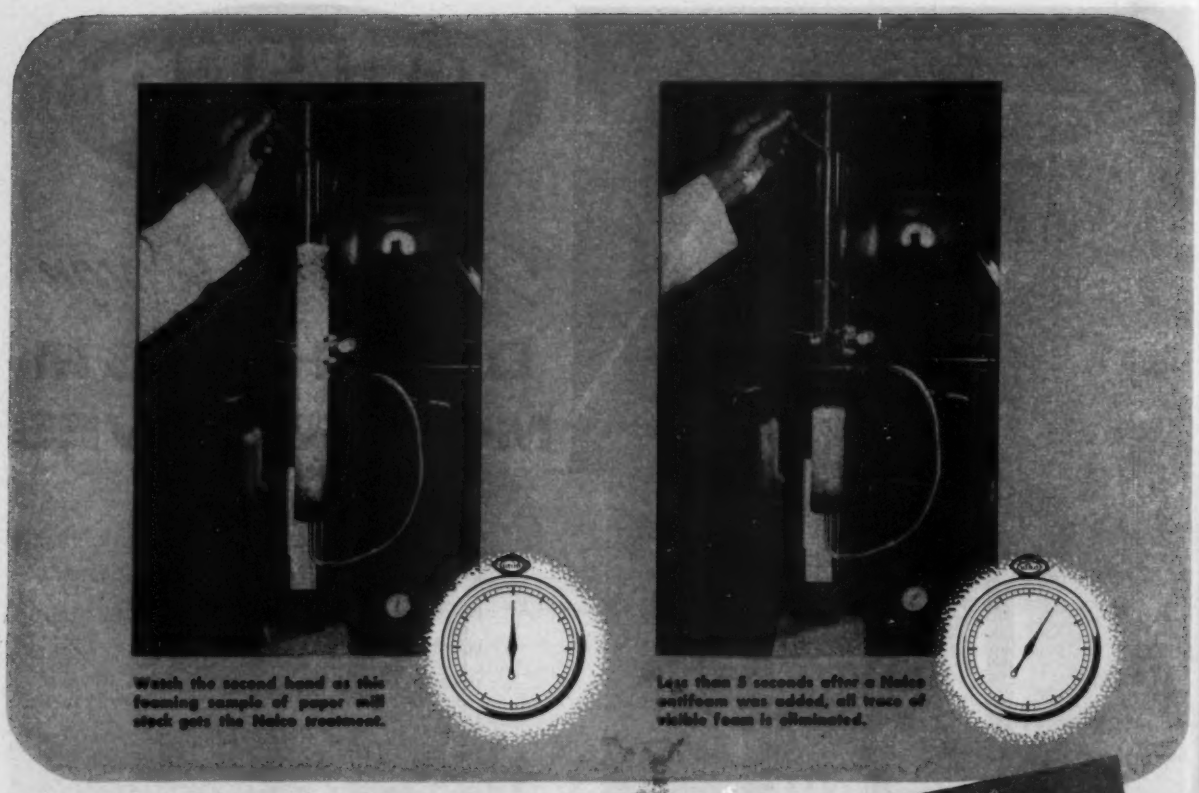
Our 75th



Watch the second hand as this foaming sample of paper mill stock gets the Nalco treatment.

Less than 5 seconds after a Nalco antifoam was added, all trace of visible foam is eliminated.

furthermore...

Nalco GETS THE DROP ON FOAM YOU CANNOT SEE!

THE simple demonstration above leaves no doubt that Nalco chemicals quickly and effectively eliminate all visible foam.

But here are even more conclusive findings: (1) In a mill where there was *no visible sign* of foam, the application of a Nalco antifoam quickly produced a very substantial increase in screening efficiency . . . and overall production; (2) In another mill, Nalco chemicals solved the problem of an erratic Decker level where there seemingly was no foam. Here, too, production went up through increased Decker capacity.

Simplest explanation of Nalco effectiveness is the dual action — *antifoam* action to prevent bubbles from forming . . . *defoaming* action to combat existing foam! Your Nalco Representative has all the facts, or write direct.

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The Paper Industry

Technology • Engineering • Management • Production

VOLUME 37 • NUMBER 9 • DECEMBER 1955

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Fritz Publications and its staff extend to their readers and advertisers A Merry Christmas and best wishes for a prosperous and Happy New Year.

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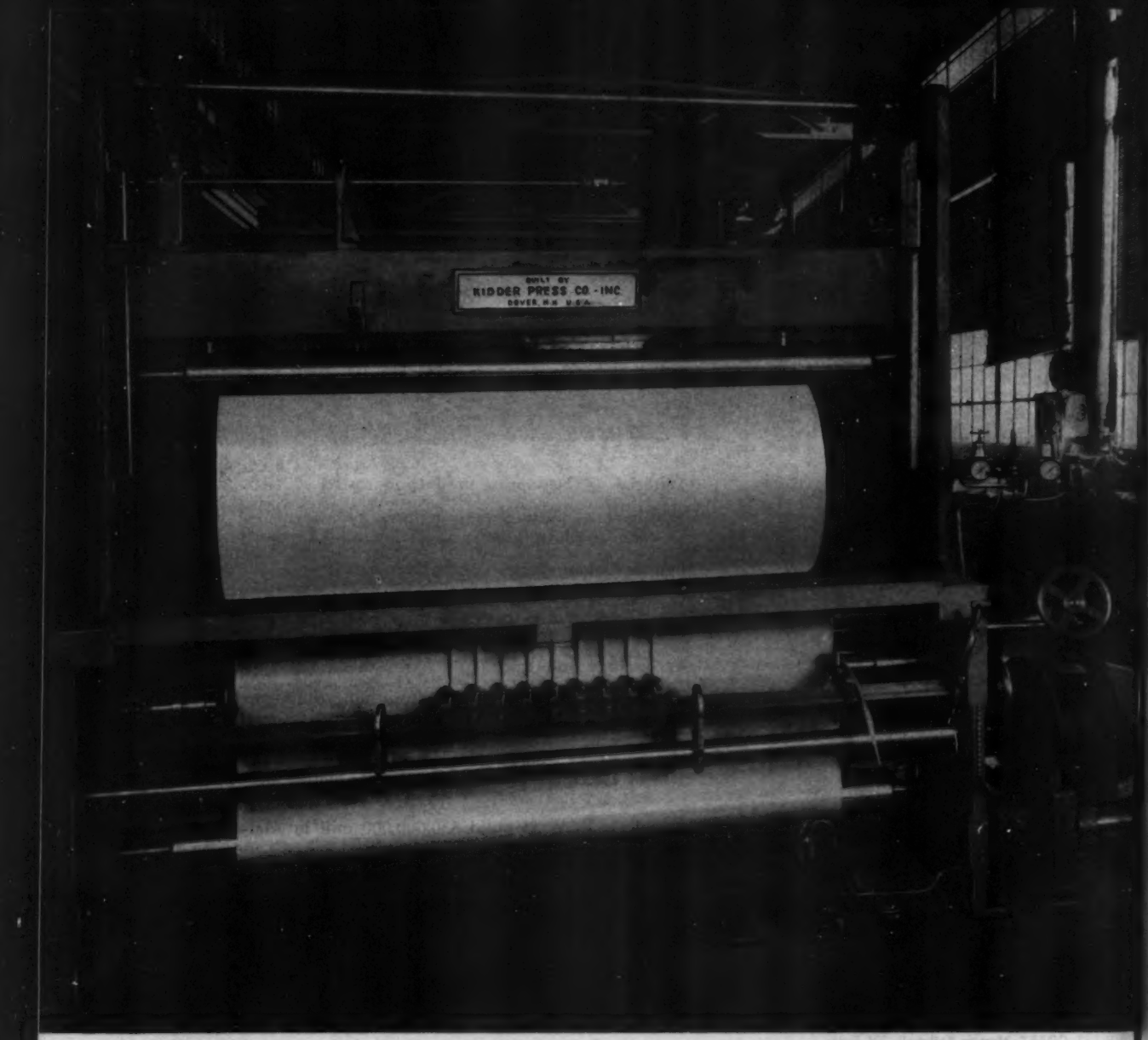

No Other Slitter offers you the cost-cutting, gearless construction of the Kidder Model G. T. Many other advancements make it ideal for handling stock ranging from 200 pound tag to the lightest tissue.

When you're measuring slitting-accuracy in thousandths...

nothing can equal Kidder shear cutting. On this Kidder Model G. T. Slitter, for example, the back cutters controlling the width of cut cannot move, and the front cutters are self-sharpening. This advanced shear-cut method — standard on all Kidder Slitters — assures maximum accuracy, long service life, dust-free slitting and positive roll separation.

In addition, the Model G. T.'s gearless drive design (introduced by Kidder in 1949) plus anti-friction bearings and dynamic balancing help keep maintenance at its very lowest.

These are just a few of the reasons why you can count on the Model G. T. Slitter for continuous high speed, high production operation, with negligible down time. For full particulars on the Model G. T. and on all Kidder Slitters and Winders, write to Kidder Press Company, Inc., Dover, New Hampshire.

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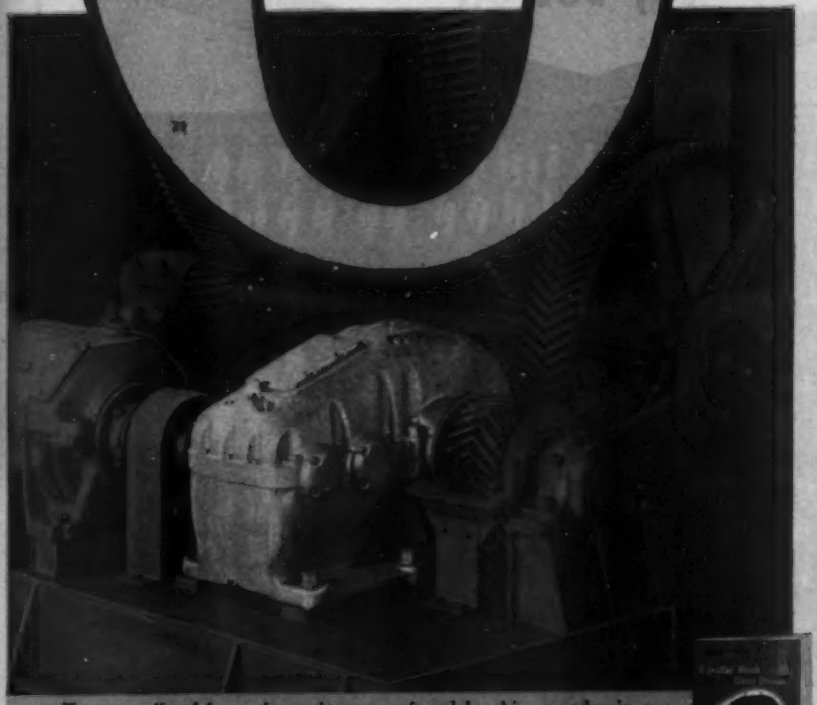
3 POINT SLITTERS

High Speed Operation
Dust-Free Cutting • Easy Roll Separation

6 reasons why Link-Belt Parallel Shaft Gear Drives ASSURE CONTINUOUS PRODUCTION



Ten-ton coils of hot strip steel are transferred by this up-ender in a modern mill. Link-Belt parallel shaft gear drive fitted with outboard bearing on output shaft withstands the exceptionally tough duty.

LINK-BELT'S compact, self-contained parallel shaft gear drives are designed to avoid common problems encountered in transmitting heavy shock loads. Here's how:

1. FOR DEPENDABLE OPERATION gears are precision-machined, shafts rigidly supported.
2. TO WITHSTAND HEAVY SHOCK and overhung loads, ball and roller bearings are used throughout.
3. TO PREVENT ENTRANCE OF DIRT and moisture, effective grease-lubricated seals are used on all shafts.
4. FOR SUPPLYING OIL to each rotating part at all speeds, automatic splash lubrication is used.
5. TO PREVENT REVERSE ROTATION on conveyors, elevators and similar equipment, a built-in backstop can be provided.
6. FOR EASY INSPECTION OR MAINTENANCE, all parts can be removed without disturbing base, which can be grouted in concrete.

Book 2619 gives complete details. Get a copy from your Link-Belt office or authorized stock carrying distributor. Or write direct.

Get JOB-MATED drive combinations from the complete Link-Belt line

In addition to parallel shaft gear drives, Link-Belt builds in-line helical and worm gear drives, Gearmotors, Motogears, variable speed drives, fluid drives, chains, sprockets, couplings, bearings, etc. All are pre-engineered for easy installation and maximum efficiency.

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LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,074

Through this door pass all knives for BOLTON FILLINGS

ALL BOLTON Jordan Plug and Shell knives go into our specially designed Circulating Oil Quench for Hardening and Tempering — then into this Precision Controlled, Recirculating Atmosphere, Gas Furnace.

HEAT TREATING at the Bolton plant is an exact science. Raw materials are carefully analyzed and controlled. Timing and critical temperatures are calculated for maximum, dependable knife hardness. Strategically placed thermocouples assure uniform heat throughout the furnace. Electrically controlled gauges and a red line continuous indicating graph assure temperature tolerances within 5 degrees.

QUALITY CONTROL of this kind* is important to users of Bolton plug and shell fillings for:

- The economy of longer, trouble-free wear.
- Uniform hardness the entire knife length as well as throughout the plug and shell knives that make up a complete Jordan filling.
- Identical knife properties on each re-order.

*BOLTON is the only Fillings manufacturer with in-plant heat treating facilities.

For Fillings of *any metal*, in *any design*, for *any machine*

—buy BOLTON

Circulating Oil Quench for hardening and tempering.

Control Panel in rear of Heat Treating Furnace right.

John W. & Sons, Inc.

Lawrence, Massachusetts, U.S.A.

to give you highest sheet standards

Edgar Clay technicians were *first* to "Spray Dry" paper coating clays—the same process used to make your morning's instant coffee.

Results? Ultra-uniform coating clays that do amazing things to paper quality.

Today's "slick" magazines—and countless other printed messengers—owe their bright, smooth finish to this processing milestone. The means and the end are inseparable "first cousins."

Papermakers reap wide benefits from EDGAR Coating Clays, and the modern processing and quality control methods behind them. High brightness, low moisture, minimum residue, controlled viscosity, plus *true uniformity* . . . all are unvaryingly yours in *every* car, year in, year out.

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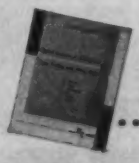
SPRAY-SATIN Coating Clay: A fine fraction, spray dried, predispersed coating clay with unmatched uniformity, low moisture content, excellent make-down properties, high bulk density, and high brightness. Specially fractionated—ideal for both high and low solids machine and conversion coating and size press coating applications.

PREDISPERSED HT Coating Clay: A spray dried, predispersed, intermediate fraction machine and conversion coating clay suitable for both high and low solids applications . . . excellent for size press pigmentation.

Here's Help For You: To help you select the EDGAR *Paper Clay most suited to your particular requirements, there have just been published the full specifications and basic properties of all* EDGAR *Coating and Filler Clays . . . a copy is yours without obligation . . . please use the coupon below.*



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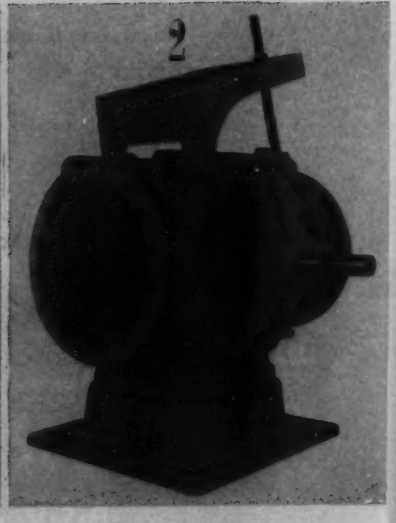
IMPCO BLEACH PLANT EQUIPMENT

- Sherbrooke Machineries Limited, Sherbrooke, Quebec Manufactures Similar Equipment in Canada



IMPCO manufactures virtually all types of mechanical bleach plant equipment for new and old plant application. These component parts are readily adaptable for re-vamping existing plants, no matter what the sequence is or is planned to be. We welcome the opportunity to work with you and if necessary tailor the equipment to best satisfy your needs.

We have long recognized the fact that there is no such thing as a standard continuous bleach plant nor are we wedded to any particular sequence flow with corresponding arrangement of equipment. We will continue to develop equipment best suited to do your job.

1 **Bleach Washers**—Impco Vacuum Washers give highest washing efficiencies at low fresh water consumption. Every Impco Washer is "Tailored-for-the-job." Made in 3′ - 5′ - 8′ - 9′6″ and 11′6″ diameter sizes up to through 20′ lengths, in any material of construction.

2 **Line Mixers**—This low-density wabble plate chemical and chlorine Saver-Mixer provides a rapid mixing result which improves retention uniformity with a big savings in chemicals.

3 **Single Shaft Mixers**—This single shaft mixer built of solid hastelloy was developed for mixing liquid ClO_2 with hi-density pulp. Its single hastelloy rotor contained in a specially designed case delivers uniformly mixed pulp and chemical at the critical moment of reaction.

4 **Scraper-Screw Dischargers**—The unit pictured here is used in continuous down-flow type high density bleachers. Developed over twenty-five years ago, this mechanism offers the most positive and fool proof method of high density stock removal.

5 **Thick Stock Pump**—This positive displacement double rotor pump in solid type #316 stainless construction easily handles stock consistencies from 10% A.D. to 17% A. D. Built in two sizes, the series 300 will handle 350 T.P.D. and the series 500 will do 600 T. P. D. plus. This unit is used in virtually every ClO_2 bleach plant today and has a definite application in high density storage work.

6 **Pulp Circulators**—Built in three sizes in a combination of any acceptable materials for bleach plant work, this specially designed propellor circulator eliminates radial projection and puts the horizontal propulsion factors to work—Result?—A down flow high density bleacher that delivers uniformly, making short circuiting ancient history.

7 **Double Shaft Mixers**—These work horses of the bleach plant, rugged in design and thorough in their job of surrounding the individual fibre with chemical, continuously and intimately mix the chemical, steam and pulp through special internal features. Repeated field tests indicate thorough mixing in pieces of pulp as small as 25 milligrams in particle size.

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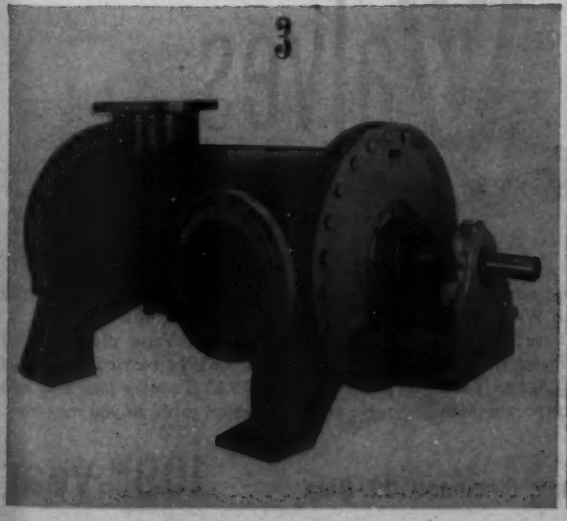


FIG. 2193 (Sectional)—
Large size, Ni-resist
Gate Valve For 200
Pounds W.O.G.

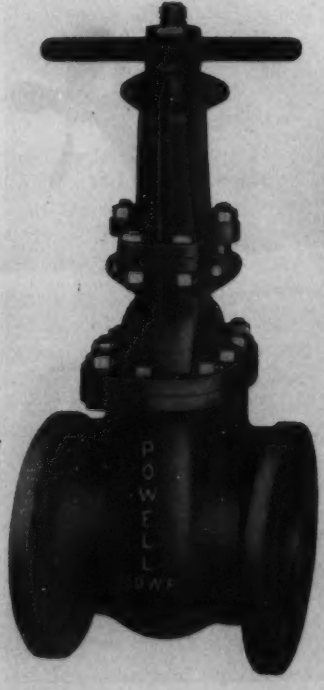
Performance--Value...

FIG. 559—Iron Body
Bronze Mounted Swing Check
Valve For 125 Pounds W.S.P.

. . . POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES . . .

FIG. 500—Bronze Screwed-in
Bonnet Gate Valve For
125 Pounds W.S.P.

FIG. 2453-G—Stainless Steel
O.S.&Y. Gate Valve For 150 Pounds.



Powell Valves

You can depend on outstanding *performance* from every valve made by The Wm. Powell Company, for Powell Valves have a proven record of long life and dependable service.

And Powell Valves give you better *value!* They're precision made and incorporate many quality features—features that can save you money and give you lasting flow control.

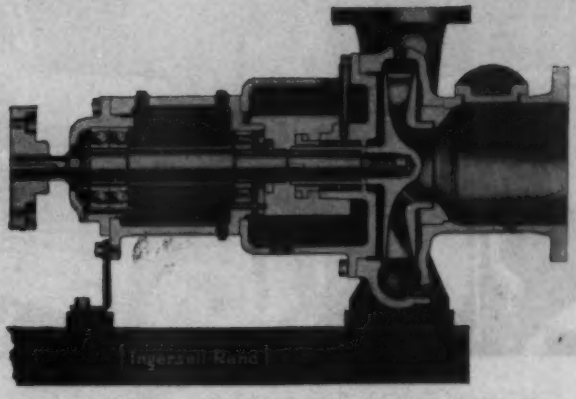
Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our *COMPLETE quality line*, and help solve any flow control problem you may have.

The Wm. Powell Company, Cincinnati 22, Ohio . . . . . 109th year

WANTED:

Your TOUGHEST Stock Pumping Jobs!

Radically new type of centrifugal pump now handles the most difficult stock solutions without clogging or air binding



Section through Class 6EH pump, showing the patented construction

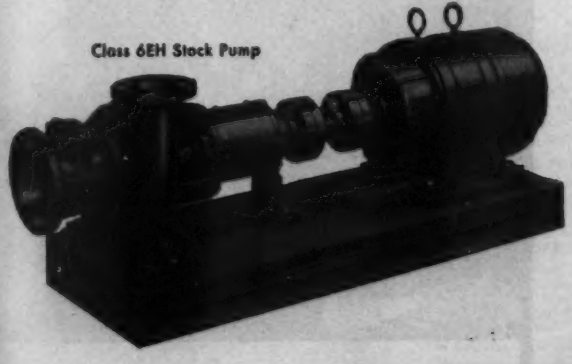
Not just a modified centrifugal pump, the new Ingersoll-Rand Class EL, EM and EH Stock Pumps feature a *radically new* and patented construction which makes them non-clogging, non-vapor-binding, self-venting and self-priming.

Paper stocks can be handled at concentrations as high as 10% without clogging. That means higher stock chest capacities, reduced bleaching costs and substantial savings in the amount of mill water required.

Treated, sized or foamy stock with up to 50% entrained air can be pumped without vapor binding or losing prime. Stock chests can be completely emptied without diluting or wasting the stock.

With *any* type of liquid, the pump will maintain its prime even when the suction piping is uncovered or exposed to the air.

Class 6EH Stock Pump



These heretofore unattainable performance characteristics result from the unique *diverging* impeller design in which the area at the exit is much greater than at the inlet. Hence the material pumped cannot enter in sufficient quantity to replace the ejected liquid and a vacuum space is created between the blades. Unlike the ordinary centrifugal pump, conversion from velocity to pressure is accomplished in the impeller as well as the casing and the relative velocities are considerably lower. This reduces impeller wear when handling liquids with high solids content.

Field experience with the new EL, EM and EH pumps has conclusively proved their ability to handle the *toughest* pumping jobs. In actual paper mill service, they are pumping stock solutions that no other centrifugal pump could handle without air binding or clogging.

If *you* have a stock moving problem that's too tough for an ordinary pump, this new I-R Stock Pump offers a practical, low-cost solution. Sizes available for capacities from 200 to 7000 gpm, heads to 225 ft. For complete details, send today for your copy of Bulletin 7325.

Ingersoll-Rand

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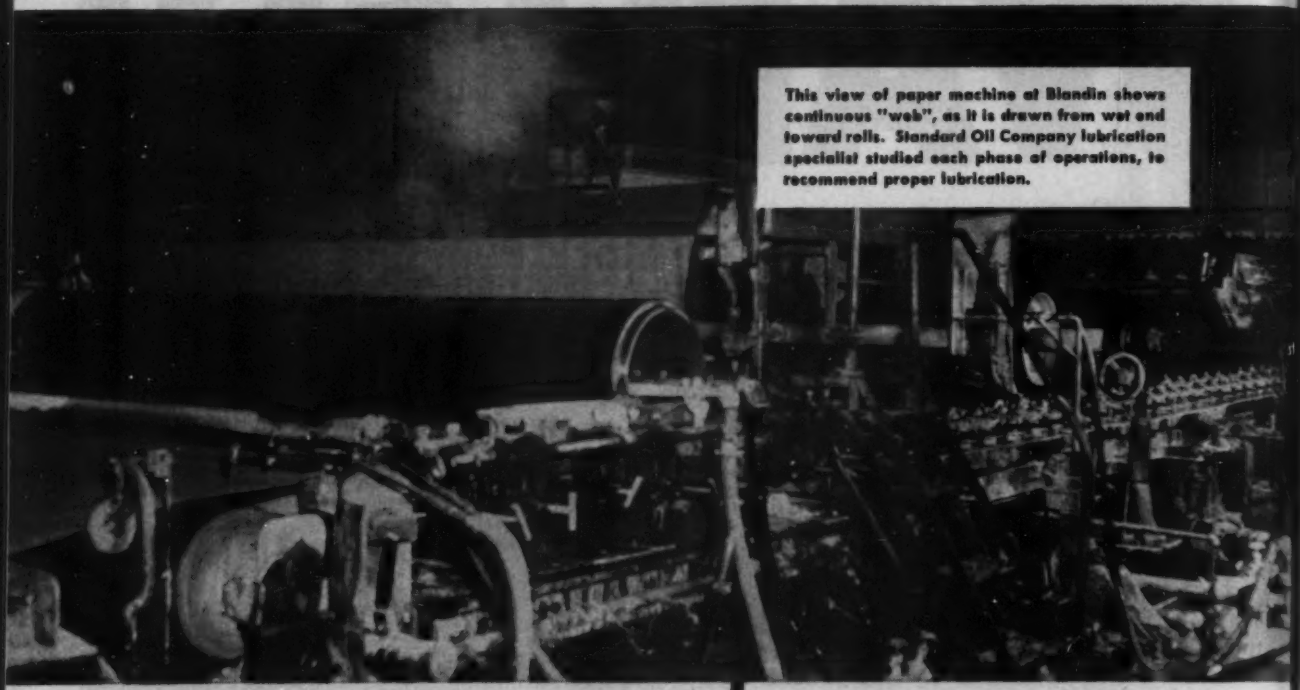
PUMPS • COMPRESSORS • CONDENSERS • VACUUM EQUIPMENT • GAS & DIESEL ENGINES • ROCK DRILLS • AIR & ELECTRIC TOOLS

STANOLITH GREASE overcomes trouble spot, keeps paper rolling at BLANDIN



This view of paper machine at Blandin shows continuous "web", as it is drawn from wet end toward rolls. Standard Oil Company lubrication specialist studied each phase of operations, to recommend proper lubrication.

STANOLITH Grease aided the solving of a rough lubrication problem at Blandin Paper Company in Grand Rapids, Minnesota.

A bottleneck on the paper making machines threatened production at this hustling paper plant four years ago. The trouble occurred near the beginning of the process, where the pulp contains up to 99% water. At this point, bearings are greeted by a shower of water and stock.

Greases were quickly lost, literally washed away. Bearings were ruined early in life. Not only had greases failed in their duty but they caused paper staining.

A Standard Oil lubrication specialist recommended STANOLITH Grease for use on the wet end of the paper machine. It did such a good job that Blandin maintenance personnel put this multi-purpose grease to work on other applications, too. Now, except when open gear and brick greases are required, STANOLITH serves the entire plant, replacing a wide number of single-duty products.

STANOLITH is truly a multi-purpose grease. It may be used almost anywhere on the job, in mechanical or hand-operated dispensers. STANOLITH Grease is heat and water resistant. It will reduce grease inventories, eliminate waste and prevent costly application errors. Find out more about how STANOLITH Grease can help you do many tough lubrication jobs with just *one grease!* In the Midwest call your nearby Standard Oil lubrication specialist. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Blandin maintenance man, Fred Harwood (left), and I. A. Westerlund, Standard Oil lubrication specialist, inspect a table roll bearing. This is just one of many places in the plant where STANOLITH Grease provides top-efficiency lubrication.

I. A. Westerlund is a graduate of the University of Minnesota with an engineering degree. He is also a graduate of Standard's Sales Engineering School, and makes good use of his training in providing technical service to customers. He's been doing this for 14 years. His customers find this experience and training pay off *for them.*

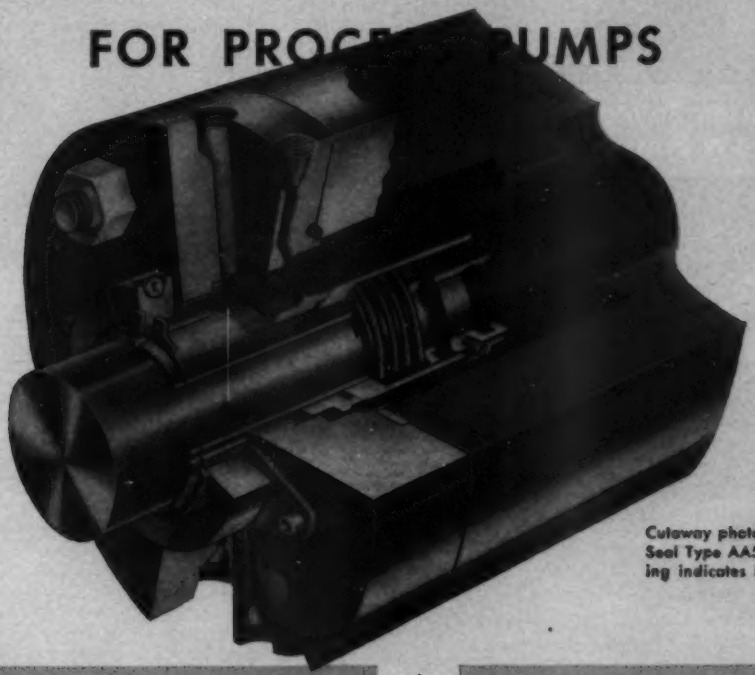
STANDARD

STANDARD OIL COMPANY (Indiana)

NEW from GARLOCK...

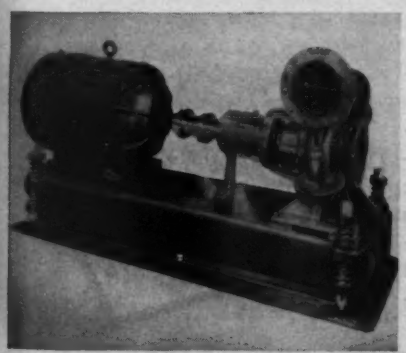
MECHANIPAK* SEALS

FOR PROCESS PUMPS



Cutaway photo of Garlock Unitary Seal Type AA518-23. Yellow shading indicates liquid being sealed.

- One Piece Assembly
- Quick, easy installation
- Pre-set at factory
- Maintenance-free life



Typical digester circulating pump for which Garlock Unitary Seals are designed.

SAVE installation time, eliminate maintenance costs with Garlock's new Unitary Mechanipak Seals for process pumps!

The entire unit, including sleeve and gland, is furnished completely assembled. The seal is pre-set at the factory—no on-the-job adjustments are needed. The *external* lock and drive is readily accessible—eliminates set-screw drive.

Get all the facts today! Phone your Garlock representative or write for new Folder AD-151.

The Garlock Packing Company, Palmyra, New York

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In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

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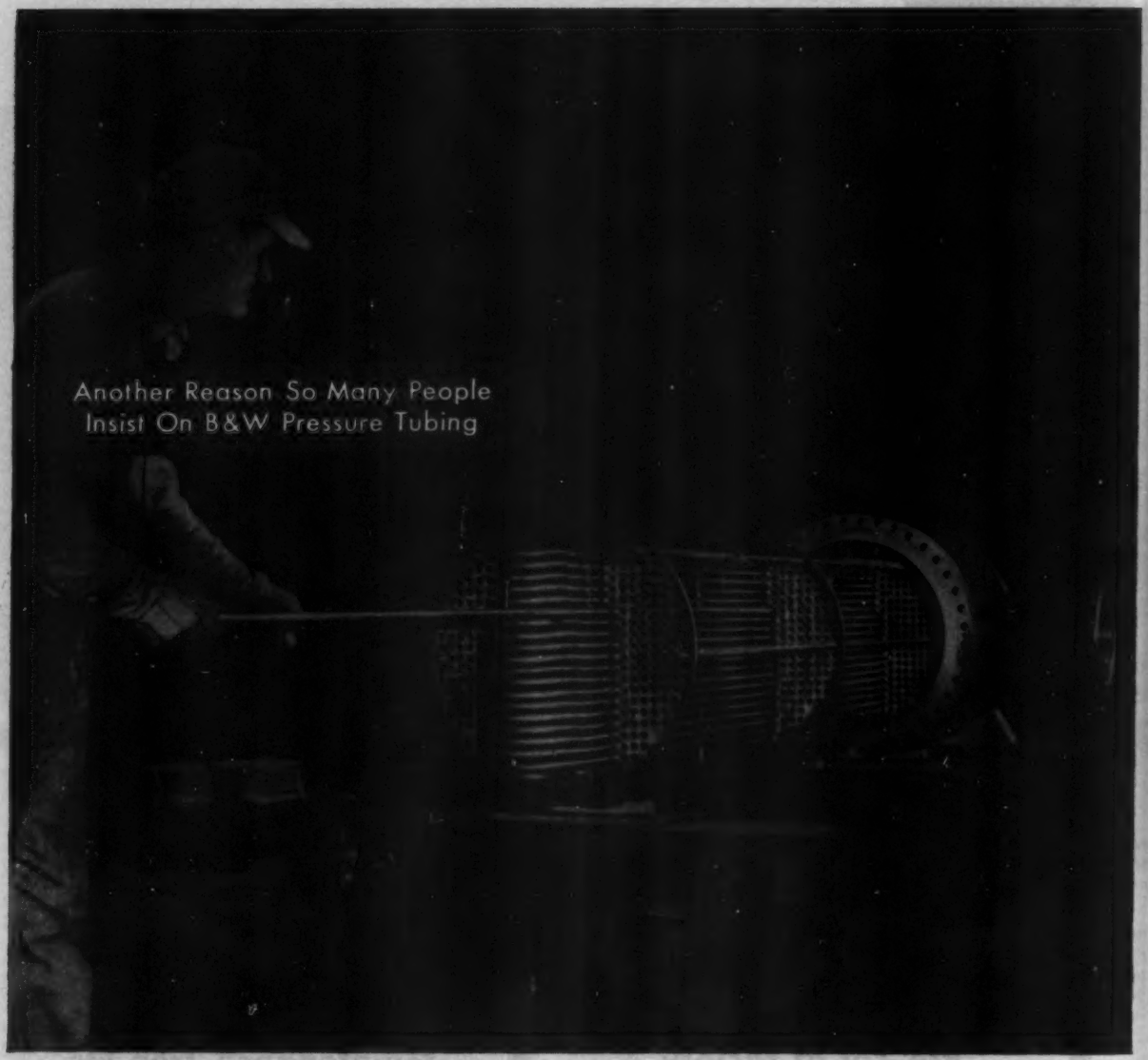


TALK ABOUT TOLERANCES!!

In oil fields, refineries, chemical plants—wherever heat transfer is important—you'll find Griscom-Russell heat exchangers on the job. The Griscom-Russell Company uses B&W Pressure Tubing to help build its reputation for efficient equipment. There's no jamming or tube distortion when threading B&W tubing through tube sheets and baffle plates. This preoccupation with close tolerances—a workaday rule at both B&W and Griscom-Russell—assures closer control, greater efficiency in many heat transfer operations. In addition, B&W Pressure Tubing is famous for uniform ductility, tight joints, ease of rolling in, and low installation cost in any heat exchanger or condenser application.

For the complete story of how B&W Pressure Tubing can improve your operation, why not call in Mr. Tubes, your link to B&W. *Or write today for Bulletin TB-329-PI.*

B&W
TUBULAR PRODUCTS DIVISION

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa. and Milwaukee, Wis.: Seamless Tubing.
Welded Stainless Steel Tubing
Alliance, Ohio: Welded Carbon Steel Tubing
Milwaukee, Wis.: Seamless Welding Fittings

TA-5022(P)

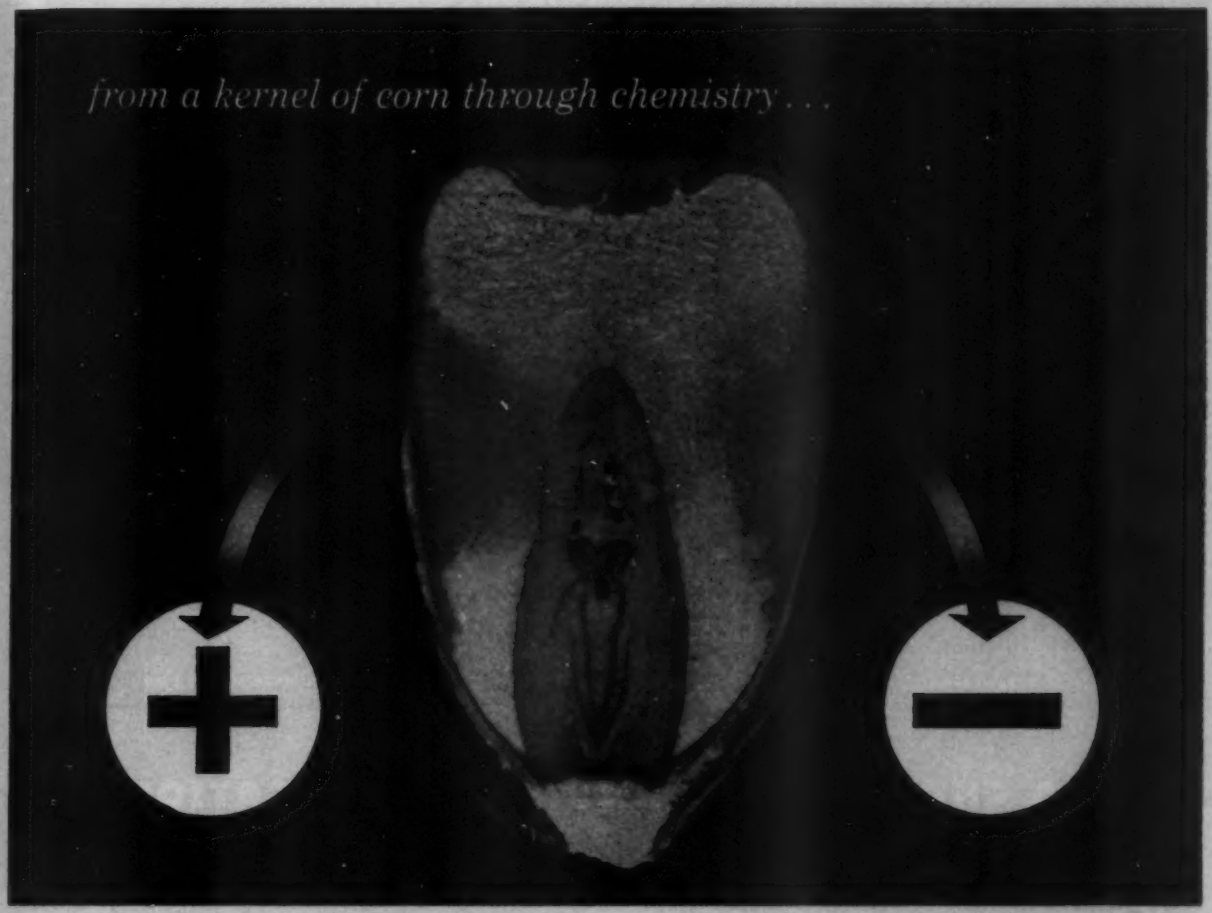


Photo courtesy of Corn Industries Research Foundation, Inc.

CATO STARCH: a cationic wet end additive

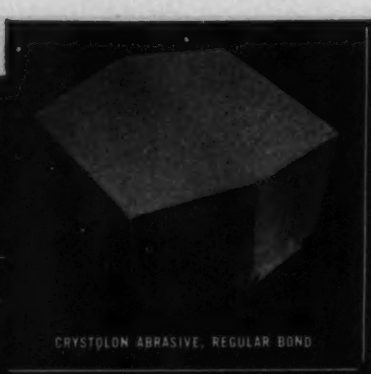
GREATER STRENGTH: Cato starch through its cationic molecular groups improves inter-fiber bonding between cellulose fibers as compared with usual type additives. Since Cato starch functions electrochemically, rather than by physical effect, only small amounts—¼ to ¾%—on the pulp are required to obtain significant improvements in surface and internal strength.

GREATER FILLER RETENTION: Cato improves retention of pigments and fillers while maintaining or increasing strength factors. Yet stock drains freely on the wire and faster machine speeds are possible. The result? Brighter sheets with improved opacity. Expensive pigments are utilized more efficiently. Mullen, pick, fold and tensile strengths are increased.

Good results can be produced with sulfite, soda and groundwood pulp as well as with kraft and reclaimed stock. Cato is easily prepared and may be used with a variety of preparation systems. It is equally effective on both fourdrinier and cylinder machines. Why not let one of National's paper specialists help you adapt Cato to your own mill? **Your problem** may not be a new one to us.

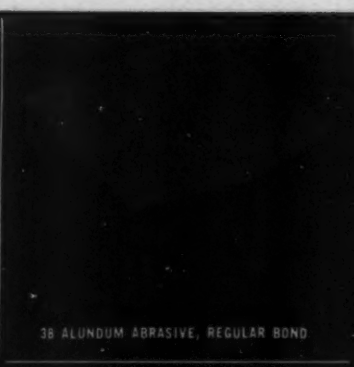
National STARCH PRODUCTS INC.

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11



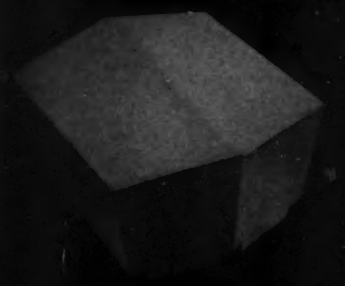
CRYSTOLON ABRASIVE, REGULAR BOND

REGULAR ALUNDUM ABRASIVE, REGULAR BOND



38 ALUNDUM ABRASIVE, REGULAR BOND

Can Your Pulp Be Improved...



REGULAR ALUNDUM ABRASIVE, G BOND

38 ALUNDUM ABRASIVE, G BOND

BY A CHANGE IN ABRASIVE SPECIFICATIONS?

Two new pulpstones have been added to the Norton family—regular ALUNDUM abrasive, G bond and 38 ALUNDUM abrasive, G bond. With the three previous stones and the many grain and grade combinations available in all five, we can be sure to provide a stone that is exactly right for you — that will produce the very best quality pulp from your wood.

Norton Technical Service can help you select exactly the right stone specification to meet your special conditions. It's service that is based on over thirty years' experience in designing and building pulpstones for all types of groundwood mills. It's service that is available from either of Norton Company's modern pulpstone plants — at Worcester, Mass. or Hamilton, Ontario.

NORTON

Making better products...to make your products better

Abrasives · Grinding Wheels · Grinding and Lapping Machines · Refractories · Porous Mediums · Non-slip Floors · Norbide Products

A FIRE PROTECTION SYSTEM
is as good as its WATER SUPPLY
Don't get caught with a water supply that is too little and too late. A Horton® elevated tank will provide your sprinkler system with a dependable gravity pressure water supply that is always ready to flow—day and night. Your plant will have the protection it needs . . . and elevated tanks often pay for themselves quickly in reduced insurance premiums.
Write our nearest office for further information on a Horton elevated tank for your plant.
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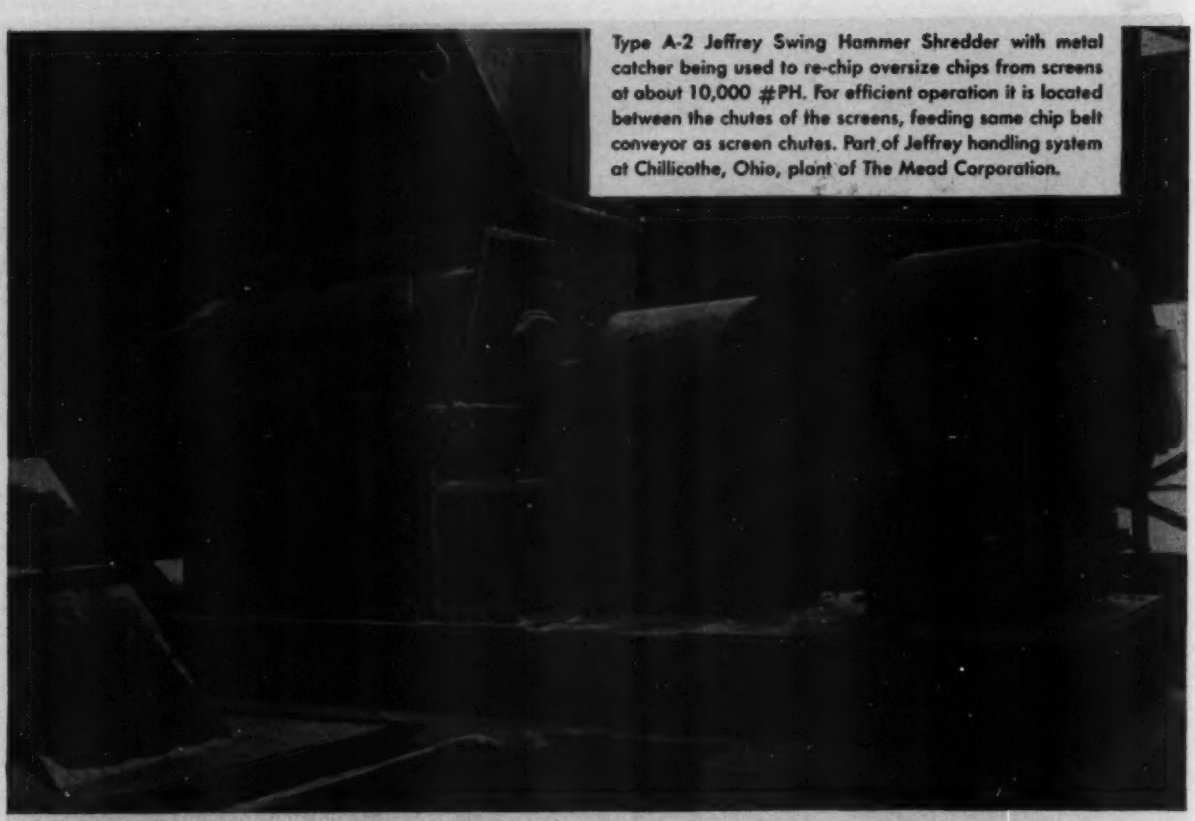
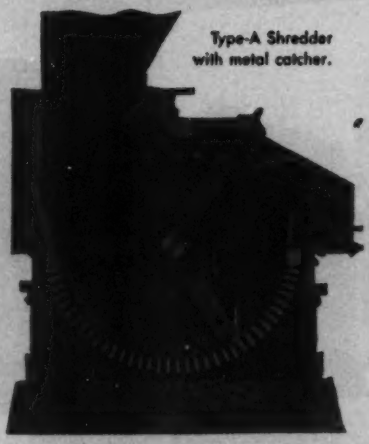
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.



Type A-2 Jeffrey Swing Hammer Shredder with metal catcher being used to re-chip oversize chips from screens at about 10,000 #PH. For efficient operation it is located between the chutes of the screens, feeding same chip belt conveyor as screen chutes. Part of Jeffrey handling system at Chillicothe, Ohio, plant of The Mead Corporation.

JEFFREY swing hammer shredders aid production at The Mead Corporation



Type-A Shredder with metal catcher.

Jeffrey Swing Hammer Shredders are widely used in paper mills for most efficient production. Our range of types and sizes permits engineers to select the ideal unit according to feed, speed and size of product desired.

A typical use of Jeffrey Shredders is reduction of oversize bark and broken logs from the barking drums to make a uniform fuel. Jeffrey Shredders also take oversize chips from the screens and reduce them for the cookers. They do an excellent job of semi-refining partially-cooked screenings and oversize material from the knotters. They reduce salt cake with fine results.

Rigid Hammer Shredders for pulp, broke or Kraft sheets complete the Jeffrey line for the paper industry.

WRITE FOR NEW CATALOG NO. 855

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

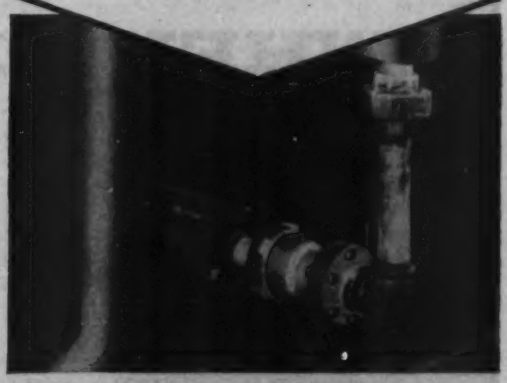
PLANTS IN [illegible], ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED
. . . IT'S A JOB FOR JEFFREY!

BARCO REVOLVING JOINTS

ON JOB 4 YEARS —NO REPAIRS!

These 1" Barco Type IBR Revolving Joints shown in the accompanying photographs (syphon style, above; single flow style, below) handle 45 psi steam at 20 to 30 RPM and run up to 8 hours per day. Their record of four years' service without repairs under normal conditions of temperature, pressure, and speed shows that BARCO IS YOUR BEST INSURANCE FOR LONG, TROUBLE-FREE SERVICE when you need *rotary steam joints* on rolls, dryers, drums, calendars, and mixers.



Performance that Pays Dividends IN PAPER MILLS

HOW MUCH is it costing you to use less efficient types of rotary joints? . . . For Repair Parts? . . . For "Down Time"? . . . For Extra Power Costs? CHECK YOUR RECORDS—then look at these Barco advantages:

- Trouble-free Performance! Thanks to long lasting "CTR" V-Type Seal Rings—a Barco Development.
- Low Maintenance; No Adjusting. Easy to inspect or service, with no special tools required.
- Low Torque—Cuts Power Costs up to 50%—particularly, at higher pressures.
- Unexcelled Ability to withstand Vibration and Hard Usage.
- Better Temperature Control where steam is used for heating rolls due to better circulation. Barco Joints hold seal standing or running.

You can prove it on your own equipment! Make this test now with new, improved Barco Revolving Joints. Send for complete information and a copy of Catalog No. 300.

● CATALOG 300

SEND FOR INFORMATION

BARCO MANUFACTURING CO.
526N Hough St., Barrington, Illinois

Gentlemen:
Please send me information about Barco Revolving Joints checked at right.

Name_____

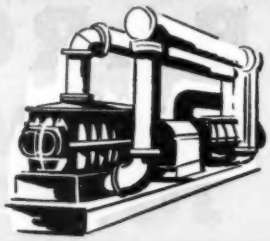
Company_____

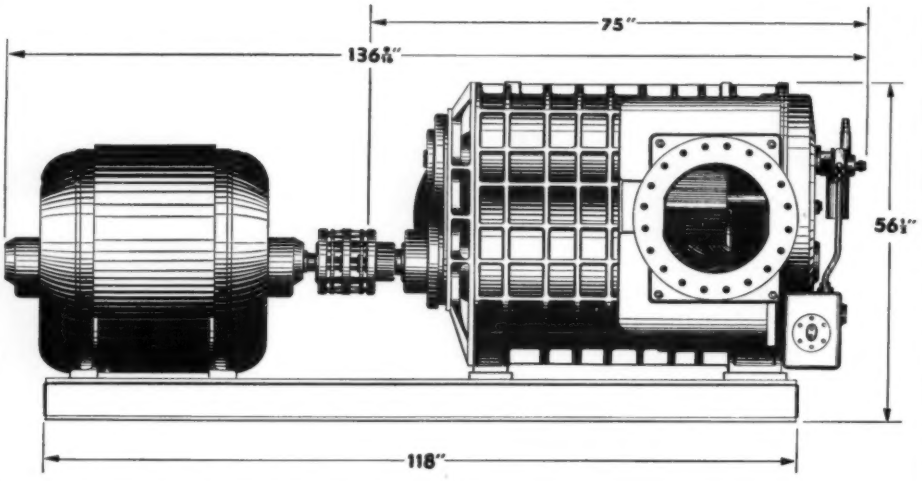
Address_____

- ☐ Single flow styles. Series 150. Sizes ½" to 2".
- ☐ Syphon Styles. Series 150. Sizes ½" to 2".
- ☐ Revolving syphon styles. Sizes 1" to 2".
- ☐ Series 250 for higher pressures. Sizes 2½" and 3".
- ☐ Heavy duty joints. Sizes up to 5".
- ☐ High speed Type NV joints. Size ¼".

Vacuum Pump Users:

why use two-





400 HP motor
1200 RPM

Standardaire 175x32 Vacuum Pump
75 inches in length, weighs approximately 8,000 lbs.

WHEN ONE WILL DO!

A *Standardaire* Vacuum Pump with low horsepower and single-stage simplicity will do the same job for you as most double-stage pumps . . . at less cost.

For example, the *Standardaire* 175x32 Single-stage Vacuum Pump operating at 1200 RPM is conservatively within the range of a 400 HP motor and gives the following tested CFM capacities—

20" HG	*22" HG*	*24" HG*
8,800 CFM	8,600 CFM	8,300 CFM

Figure what this means to you in savings. You can cut production costs, and save on floor space, too. This is possible because the rugged, compact *Standardaire* offers you greater capacity per pound of pump with less horsepower consumption.

Should you wish to stage two *Standardaires*, the same high capacities are achieved with approximately 25% saving in horsepower.

What's the secret behind the *Standardaire* capacities? Simple, rugged construction and *Standardaire's* exclusive, cycloidal screw-type rotors which compress air in a wide range of pressures with a minimum of internal leakage.

The *Standardaire* is essentially a dry-type vacuum pump, using a very small quantity of water for temperature control.

There's a *Standardaire* Vacuum Pump designed to meet your exact requirements. Get all the facts today, write . . .

READ STANDARD
CORPORATION

BLOWER-STOKER DIVISION
370 Lexington Avenue
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NO FUNNEL ACTION

because both acf Regular Round and acf Rectangular Port Valves have port areas at least equal to the pipe itself. Result: no turbulence to flow of viscous ladings and no restrictions to cause abrasion . . . no loss of head pressure . . . all highly desirable features throughout the processing industries.

Other important features are quick, quarter-turn shut off and Teflon* head seal gaskets, resulting in substantially lower maintenance costs.

Representatives in 50 Principal Cities are ready to show you how to keep down valve maintenance costs. Write for Catalog 5, PI-12, Valve Division, acf Industries, Incorporated, 1501 E. Ferry Street, Detroit 11, Michigan.

*DUPONT TRADE NAME

acf CYLINDRICAL FULL PIPE AREA PLUG VALVES

TEST PROVE
for yourself

With size press or calender stack application of Kelsize or Kelgin, you surface-treat your paper and board to secure the precise surface characteristics you require. You get just-right surfaces for brilliant mottle-free high gloss, velvety semi-gloss, or clean, sharp flat fine-line and halftone printing.

You use far less ink, yet produce brighter, clearer printing with improved uniformity, color yield and appearance. Ink films bond quickly and completely to the sheet, controlling costly and messy rub off or offsetting. You effect substantial ink savings.

Versatile Kelco hydrophilic colloids provide uniformly dense and smooth printing surfaces, uniform ink acceptance, and a better surface for coating, waxing, and varnishing.

Test prove for yourself high gloss, semi-gloss, or flat printing produced by use of these versatile Kelco hydrophilic colloids: Kelsize, Kelsize S, Kelgin, Kelgin LV, Kelgin XL. For full information about the measurable advantages you derive with the Kelgins and Kelsizes, write your nearest Kelco regional office.

KELSIZE® / KELSIZE S® / KELGIN®
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improve printability with **KELSIZE** *or* **KELGIN**

improve printability with **KELSIZE** *or* **KELGIN**

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improve printability with **KELSIZE** *or* **KELGIN**

improve printability with **KELSIZE** *or* **KELGIN**

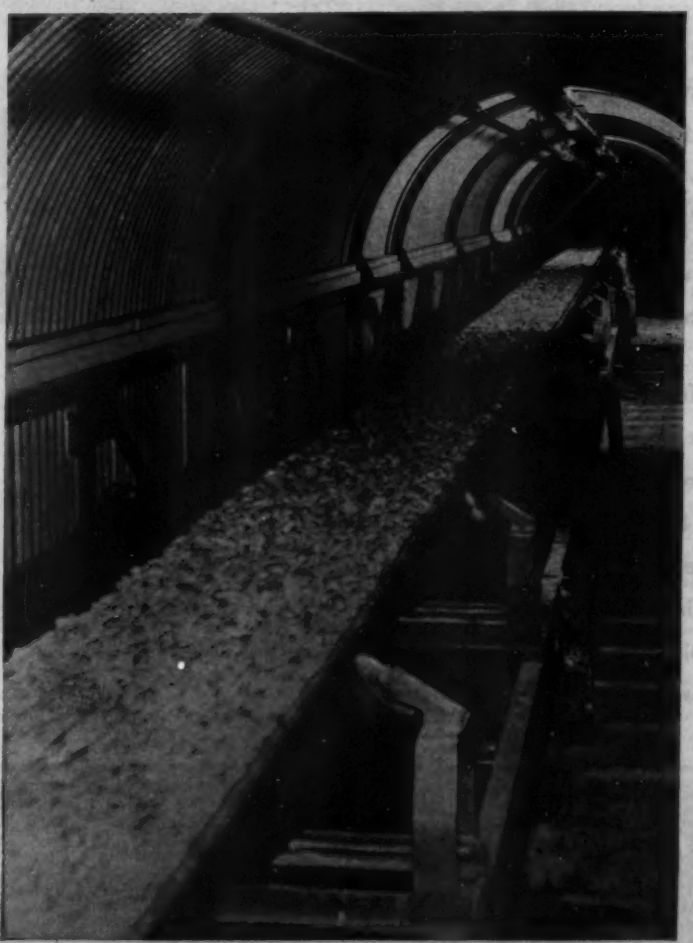
improve printability with **KELSIZE** *or* **KELGIN**

LOWER COST PER TON-MILE

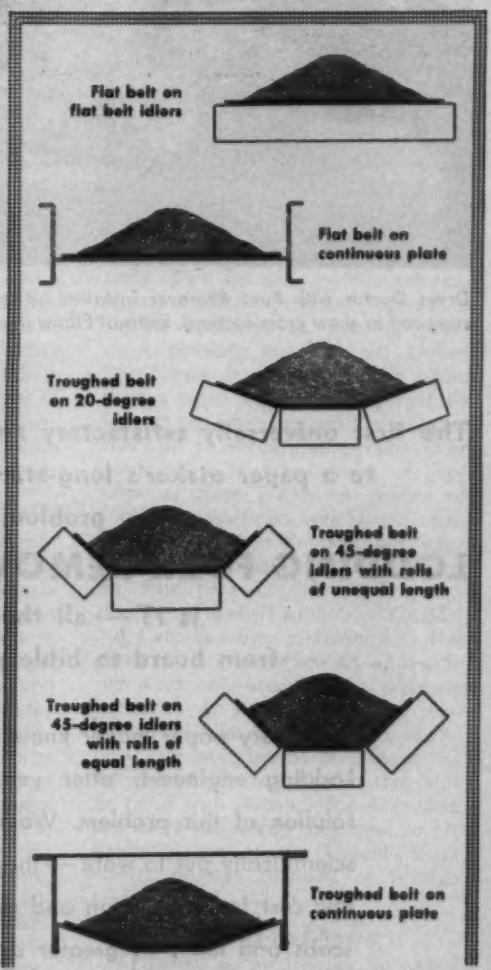
. . . yours with either a Link-Belt single belt conveyor or complete system

WHETHER you need a single belt conveyor or complete system, you'll find that Link-Belt engineering and equipment add up to lower cost per ton mile. Drawing from vast experience, our engineers can develop a system incorporating the most practical components from our complete line of quality idlers, trippers, drives, terminal machinery and other items. And if desired, we will handle erection.

Link-Belt has pioneered the development of belt conveyors for short or long hauls . . . indoor or outdoor service. To learn how this background can produce utmost economy per ton-mile in handling your bulk material, call your Link-Belt office.



Enough chips ride this Link-Belt 36-in. wide belt conveyor to produce 250 tons of kraft paper per day. Maximum chip capacity results from use of 45-degree belt idlers.

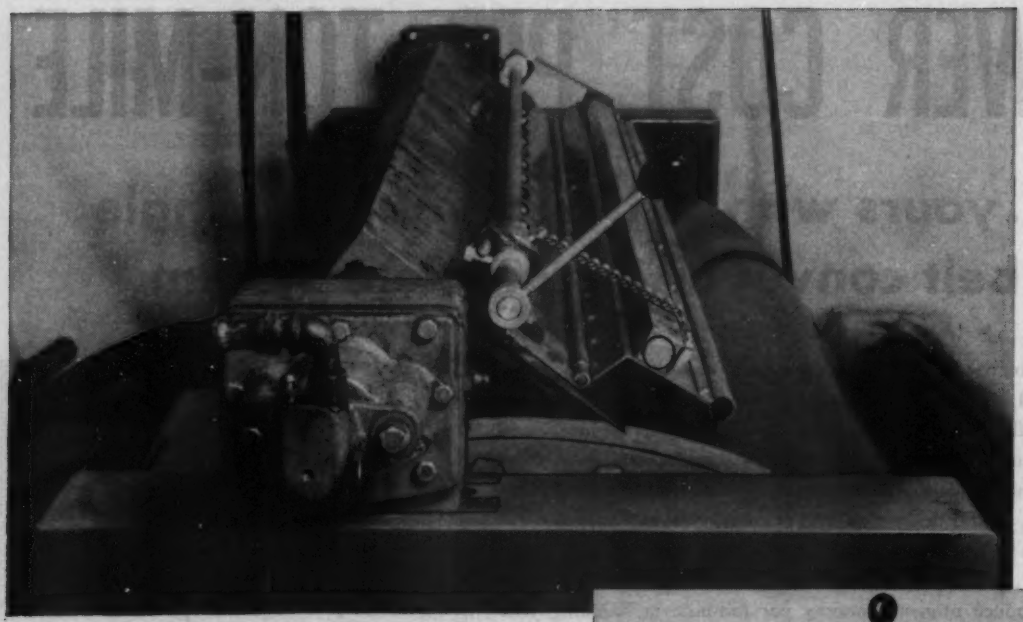

Flat belt on flat belt idlers
Flat belt on continuous plate
Troughed belt on 20-degree idlers
Troughed belt on 45-degree idlers with rolls of unequal length
Troughed belt on 45-degree idlers with rolls of equal length
Troughed belt on continuous plate

The load carrying capacity of belt conveyors is determined by the width of the belt, the shape of its loaded cross section, and the angle of repose of the material being carried. Link-Belt offers you one source for all belt conveyor components—including 500 idler sizes in 35 types . . . plus pulleys, drives, trippers and supports.

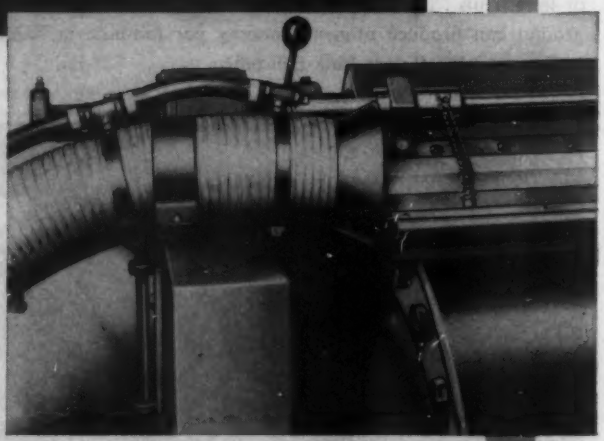
LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13.507



Dryer Doctor with Fuzz Remover installed. (Exhaust Elbow removed to show cross-section). Exhaust Elbow in place, right.



The first universally satisfactory answer to a paper maker's long-standing problem . . . .

LODDING FUZZ REMOVER

is IT — all the way from board to bible paper

Every paper maker knows fuzz is a nuisance in the air and on the sheet. Lodding engineers, after years of study and experimentation, announce a solution of this problem. Working on a new principle — a series of air jets scientifically put to work — they have arrived at a highly successful solution at low cost for installation and operation. This means a better sheet, free from scabs and lint . . . greater drying efficiency from cleaner dryers . . . removal of the fire hazard caused by airborne floating fuzz. Application of this equipment to several machines has resulted in outstanding benefit.

LODDING ENGINEERING CORPORATION

WORCESTER, MASSACHUSETTS

CURRENT COMMENTS

A deluge of tears . . . lacking: true reciprocity . . . and in memoriam

Wanted: By the American newspaper publishing industry, a large consignment of crying towels! The publishers have taken possession of the Wailing Wall as a result of the increase in price of standard newsprint paper, the action instituted by the government alleging violation of certain fair trade laws, and the inability of reportorial representatives to get all the news that they think they should have from government agencies.

The major deluge of tears came with the announcement by various newsprint manufacturers, principally in Canada, of an immediate increase in the price of newsprint. The increases ranged from $3 to $5 per ton. The newspaper publishers claim this increase will make publication unprofitable for some of their number. The complaints have resulted in various proposals at Washington to ameliorate the situation. There is a certain grim justice, perhaps, in the fact that the publishers by securing favorable legislation drove the bulk of the newsprint manufacturing industry into Canada and forced abandonment of output of this paper by all but a limited number of domestic companies. With the production centered in Canada, the manufacturers were outside the target area of United States anti-trust legislation.

Two factors seem to have been overlooked in the present situation. First is the fact that the price of papers to readers has risen in at least an equal proportion to the increased price of newsprint. A more important point is the recent statement by governmental agencies that as of this year North American production and consumption is practically in balance. There is actually an exportable surplus.

No agreements or conspiracies

The fact that some companies have raised their price and others have made no such decision, and the fact that the increases vary company-by-company destroys chance for a claim that the increase is due to any agreement or conspiracy between the manufacturers.

Various solutions by legislators chronically favorable to the publishing industry range from proposals to subsidize the building of new United States mills—use of tax money to help the newspapers—to different types of legislative restrictions on manufacturers, but with all this a realization that United States laws cannot operate in Canada.

The newsprint question, however, is not all that troubles the publishers. While representatives have been protesting to Congressional committees against efforts of government agencies to suppress, or at least secure favorable color for their activities, the Department of Justice has been preparing an anti-trust case against the newspapers and advertising agencies, charging collusion or other similar conspiracies to set an agreed standard of fees allowed advertising agencies for their placement of lineage in the publications. The details are too involved to be discussed in brief form, but the publishers claim that the initiation of this action is a malevolent attempt by the government to throttle or control the dispensers of the news of government.

The battle progresses

The battle over foreign economic policies as represented by pending proposals to still further reduce United States duty rates in behalf of the prosperity of foreign nations has progressed apace. On the surface it appears that the revulsion against further tariff reductions is likely to have some effect, despite the admitted State Department program to approach a free trade basis as far as the United States is concerned. Much of the outcry is now against the unfair procedures of foreign nations. The Committee for Reciprocity Information, which sat in early November to hear testimony on the proposed duty rate reductions, was given a repeated array of instances in which true reciprocity is lacking on the part of nations benefitting from United States policies. Much of the complaint was that Canada is remaining a high-tariff nation, while pressing the United States for reduction of rates on Canadian exports. The paper industry appeared in some such representations. Two branches of the printing paper industry protested against a further reduction of printing paper rates, pointing out that the United States rate is already hardly more than a third of the rates levied by Canada on similar papers. Briefs were filed by paperboard and kraft liner producers against reductions of duty rates on these grades. A picture of foreign competition, not alone from Canada, but from England and Scandinavia was presented by branches of the fine paper industry. (American beer is practically barred from Canada, but Canadian beer is flowing in this direction in a heavy stream, approaching a torrent, according to domestic brewers.) An American Foreign Service officer who will participate in the duty rate negotiations at Geneva has warned foreign nations that they will be faced with demands for more than the token reciprocity they have so far exhibited toward the United States efforts to ease channels of foreign trade.

Without damage at home

Agitation is progressing in other directions. The Twentieth Century Fund has released a survey of the foreign trade problem entitled "American Imports," in which it is asserted that the benefits of maximum trade cannot be achieved without damage to domestic industries. It recommends that a shift of displaced workers be effected by federal loans to readjustment agencies for the retraining of workers forced out of their accustomed employment, together with provision for adequate unemployment insurance. Meantime another organization of importing agencies has been

formed to press for a modification of anti-dumping laws, already less restrictive than those of nations to which American products are shipped.

While the political pot is boiling to almost the overflow point, the industry's financial situation is at a high peak. Income has increased, and a survey just issued by Lawson Turcotte, president of Puget Sound Pulp & Timber Co., sees 1955 production of pulp to meet the needs of paper and paperboard mills reaching a total of 14 per cent over any previous record. Domestic pulp output, according to this recognized authority in this field, was nearly 15,500,000 tons in the first nine months of 1955, as against 18,000,000 tons produced in the entire year 1954.

The Industry's Loss

The late weeks of October and early part of November saw loss to the industry through death of some of its outstanding figures. D. Clark Everest, board chairman of Marathon Corp. and formerly president of the American Paper & Pulp Association and prominent in all industry councils, passed away in a Wisconsin hospital. Amor Hollingsworth, one of an outstanding New England papermaking family and former chairman of Tileston & Hollingsworth Co., died shortly after his retirement from active paper mill offices. Stephen Florio, who had only recently taken over the management of Marvellum Co., died suddenly while on a business trip.

Current comments . . .

Financial Reports

Just as the general securities markets recovered after the drop caused by the Eisenhower heart attack scare, paper mill securities by the middle of November had recovered most of their earlier losses and were almost universally higher than the quotations of a month before.

Net Incomes

American Box Board Co. — Net income for nine months ended August 31 was $1,989,387 as compared with $1,321,636 a year ago.

American Writing Paper Co. — Net nine-month income was $473,148 as compared with $381,106 a year ago.

Certain-Teed Products Corp. — Net income for the first three quarters of 1955 was $6,544,546 as compared with $3,420,720 a year ago.

Chesapeake Corp. of Virginia — Net income for 40 weeks ended October 9 was $2,900,046 as compared with $2,130,803 for the comparable period a year ago.

Container Corp. of America — Net income for the first nine months of 1955 was $11,471,000 as compared with $11,022,000 in the previous year.

Dixie Cup Co. — Net nine-month income was $3,346,296 as compared with $3,004,992 in 1954.

Federal Paper Board Co. Inc. — Net income for 36 weeks ended September 10 was $1,581,000 as compared with $2,180,000 for the comparable 1954 period.

Gair Co. Inc., Robert — Net income to September 30 was $6,749,459 as compared with $5,156,352 in 1954.

Gaylord Container Corp. — Net income for nine months was $6,105,149 as compared with $5,189,492 a year ago.

Glatfelter Co., P. H. — Net income for nine months was $1,550,391 as against $1,156,352 a year previous.

Hammermill Paper Co. — Net income for 39 weeks ending October 2 was $1,904,228 as compared with $909,433 for the comparable period in 1954.

Keyes Fibre Co. — Net income for nine months ended September 30 was $1,238,637 as against $1,085,263 a year ago.

Masonite Corp. — Net income for the year ended August 31 was $6,093,359 as compared with $3,607,388 for the previous fiscal year.

Mead Corp. — Net earnings for the 16 weeks ended October 2 were $2,794,168 as compared with $1,678,311 for the comparable period in 1954.

Minnesota & Ontario Paper Co. — Net income for the first three quarters of 1955 was $4,869,930 as compared with $4,321,066 a year ago.

National Container Corp. — Net income for nine months ended September 30 was $5,755,925 as compared with $2,403,094 a year ago.

Oxford Paper Co. — Net income for nine months ended September 30 was $2,728,973 as against $2,612,464 a year ago.

Rayonier Inc. — Net income for nine months was $12,244,128 as compared with $8,715,483 a year ago.

Rhinelander Paper Co. — Net income for the year ended September 30 was $1,628,975 as compared with $1,407,224 in the previous fiscal year.

Riegel Paper Corp. — Net nine-month income was $1,441,341 as against $1,319,508 a year ago.

St. Regis Paper Co. — Net three-quarter income was $13,175,434 as compared with $11,456,784 in the first three quarters of 1954.

Scott Paper Co. — Net income to September 30 was $15,948,967 as against $13,305,838 a year ago.

Sorg Paper Co. — Net nine-month income was $396,954 as compared with $284,283 in 1954.

Sutherland Paper Co. — Net nine-month income was $2,530,949 as against $3,328,100 a year ago.

Union Bag & Paper Corp. — Net income for the first nine months of 1955 was

Greater Production of Higher Quality Pulp

• in Less Time
• at Lower Cost

This is the end result of the various processes and equipment which we have installed in pulp mills throughout North America. Send us details of your requirements.

Chemipulp Process Inc.
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$10,652,009 as compared with $8,190,616 in the like period of 1954.

United Wallpaper Inc. — The deficit for the year ended June 30 was $2,676,670 as compared with deficit of $1,022,897 in the previous year.

Paper mill corporate changes

Allied Paper Mills stockholders have approved the sale of the company to the Thor Corp. on the basis of $46 per share for Allied common stock after the redemption of the outstanding preferred. Allied is rated as a $10,000,000 corporation.

Mead Corp. has announced the absorption of its former sales subsidiary, Mead Sales Co.

Scott Paper Co. plans a major financing next spring, according to an announcement to stockholders, though no details are completed. Authorization for an increase in its indebtedness to $150,000,000 from the present $50,000,000 has been voted by stockholders, together with an increase in capital from 10,000,000 to 40,000,000 shares. Plant facilities will be increased during the last half of this year in an expenditure of $22,000,000. Outlay scheduled for 1956 has been placed at $50,000,000, including a $21,000,000 expansion at South Mobile, Ala.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	Nov. 10, 1955	Oct. 10, 1955
A.P.W.	*4¾-5	*4½-4⅞
Celotex	33¾	31¾
Same Pref.	*19-19½	19¼
Certain-Teed	25⅛	23⅜
Champion P & F	60	106
Chesapeake Corp.	59¾	56
Container Corp.	69⅛	66½
Same Pref.	*102-103½	*102-103½
Crown Zellerbach	55⅛	53½
Same Pref.	104	103⅛
Dixie Cup	53½	48½
Eastern Corp.	28⅛	26½
Federal Paper Board	33¼	30½
Robert Gair	29⅛	28¼
Gaylord Container	55	52½
Great Northern	88	80
Hammermill	35	30¾
International	110	103
Same Pref.	*105-107	*104-104⅛
Kimberly-Clark	48	47¼
MacAndrews & Forbes	50	51½
Marathon	30¼	30⅛
Masonite	29⅛	28¾
Mead Corp.	61¼	58¾
Same Pref.	*101¾-103½	102
Same Sec. Pref.	68⅛	*66½-75
Minnesota & Ontario	64¾	58
National Container	23⅛	20
Same Pref.	41¼	34½
Oxford Paper	37½	36⅛
Same Pref.	*99½-100¼	100
Rayonier Inc.	35½	32½
Rhinelander	35⅛	34
Scott Paper	67½	65¼
Same $3.40 Pref.	*95-95¼	*93¼-95
Same $4 Pref.	*104½-105½	*102-104
St. Regis	40⅜	38⅛
Same Pref.	*103½-105½	*103½-106½
Sutherland	44	44
Union Bag & Paper	103⅜	92
United B. & C.	22⅝	23¼
United Wallpaper	1⅛	1¼
Same Pref	19	*18-18½
U. S. Gypsum	290	265
Same Pref.	*179½-181	178¼
W. V. P. & P.	48	46½
Same Pref.	*107½-109	107

New York Stock Exchange — Bonds

A.P.W. 5%	81¾	—
Celotex 3¾%	—	—
Champion P & F Co. 3¼%	—	—
Mead Corp. 3%	—	—

American Stock Exchange — Stocks

American Writing	—	20⅞
Brown Company	17	15½
Puget Sound	—	59⅛

*Closing Bid and Asked Prices.

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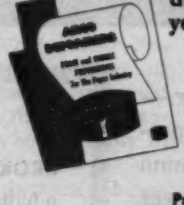

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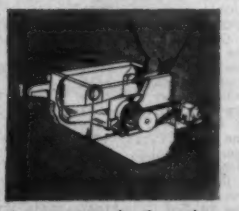

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The Paper Industry

DECEMBER 1955

Newsprint production costs

The newsprint industry, which traditionally is an industry of ups-and-downs, has moved into a position of unsurpassed strength. The current price increases demanded by newsprint producers stem from the world-wide newsprint shortage brought about by a suddenly increased newsprint consumption in the U. S. A. This consumption in the last three months has been proceeding at the rate equivalent to an annual requirement of 6,750,000 tons.

Total U. S. newsprint consumption last year was about 6,020,000 tons. This year's newsprint supply, available to United States publishers, is estimated at 6,400,000 tons plus an undisclosed, but limited, tonnage that may be available from existing publishers' stocks.

While the demand for newsprint currently is at an all-time high, it is likely to be higher in 1956. In view of the strong demand for newsprint, it seems unrealistic to argue that the general trend toward price increases is not justified. The only way to remedy the tight situation must be in increased newsprint capacity, and this can be accomplished with minimum delay only if newsprint manufacturers are given a strong incentive to do so.

North American newsprint mills (38 mills in Canada and 14 mills in the U. S. A.) now operate at more than 102 per cent of their 1955 rated capacity, and new capacity is being installed at an unprecedented rate. Total Canadian capacity is expected to increase by 800,000 tons and total U. S. capacity by 600,000 tons, or a combined total of 1,400,000 tons, by 1957. While this amounts to almost twice the additional tonnage of 730,000 tons required by the current rate of increased annual consumption in the U. S. A., the 1957 newsprint requirements are likely to remain considerably in excess of output capacity.

In view of the strong demand for increased newsprint capacity, an abridgement of Dr. Hans G. Brandes' thesis published in this issue discusses the relative production advantages in newsprint manufacturing in Canada and the U. S. A. The underlying assumption of this study is that "newsprint is produced where comparative production advantages prevail when the product is sold largely in the same market at the same price".

Pulpwood cost advantages, in view of an abundance and proximity of forest resources, limited competition from other wood-using industries, and control of future pulpwood supplies, have always been a strong attribute of the Canadian pulp and paper industry. Recently, however, these advantages have somewhat diminished in Ontario and Quebec because of the depletion of wood resources in close proximity to the paper mills and the introduction in the northeastern states of the chemi-groundwood process for newsprint manufacture, which permits the utilization of hardwoods for this purpose.

In the South, the use of southern pine for newsprint production has given the southern states a favorable profit margin, despite the fact that newsprint production from southern pine is characterized by lower pulp yields and that the South also faces severe competition for wood from other wood-using industries.

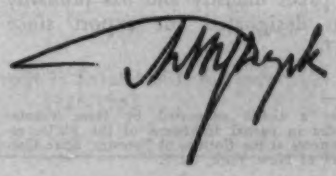
In terms of ratios of cost of pulpwood to newsprint, Dr. Brandes gives the following figures: the Northeast with a ratio of 25 per cent; Quebec and Ontario, which showed a ratio of 20 per cent up to World War II, now have a cost of pulpwood to newsprint ratio of 25 per cent; the Pacific Coast shows a ratio of 20 per cent, and the South has a ratio of less than 20 per cent.

Labor costs per unit of output are surprisingly high in the newsprint industry. An analysis of cost data submitted by a number of United States and Canadian newsprint mills in 1949 showed that the average labor cost per ton of pulp amounted to $5.05 for the three United States mills located in the West and to $3.21 for six Canadian mills located in the East and on the Pacific Coast. These results indicate that Canadian labor costs per ton of pulp were only about 63 per cent of those for the United States.

A productivity study of the United States pulp and paper mills in 1951 showed that man-hour requirements per ton of newsprint were as follows: 1.08 hours in the South; 3.65 hours in the Pacific West, and 5.87 hours in the Northeast. Consequently, in the United States, the South has the greatest production advantage in labor costs due to highest productivity and comparatively lower wage rates.

Capital costs in the newsprint industry are estimated at $80,000 to $90,000 per ton of daily capacity, exclusive of working capital, timberlands, and power plants. Capital investments per dollar of net sales are extremely high in mills producing solely newsprint. A study released by the Security and Exchange Commission in 1948 shows that the investment per hundred dollars of net sales amounted to $110 and $97 for two companies producing solely newsprint, $56 for a company producing 35 per cent newsprint, and $45 for a company producing 45 per cent newsprint.

We feel that Dr. Brandes' study is timely and should be extremely helpful in connection with current plans to increase newsprint manufacturing facilities.



Canada-United States Newsprint Trade*

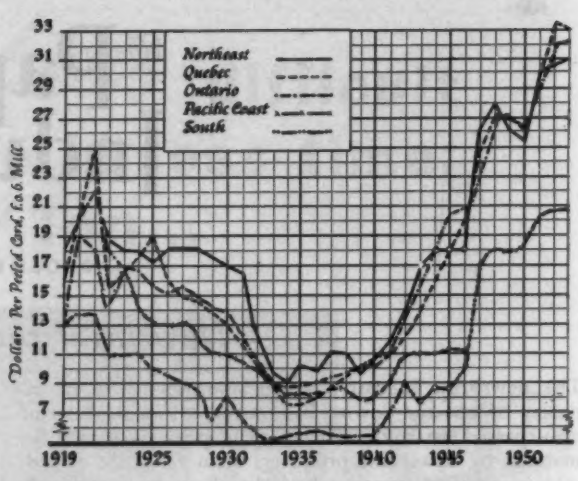
— a comparison of newsprint production costs

HANS GÜNTER BRANDES

SOME UNITED STATES newsprint producers claim that the price-cost relationship has made newsprint production relatively unattractive as compared to other papers and paperboard. Hence, the purpose of this study is to explain the newsprint trade between the United States and Canada in terms of comparative production advantages. These are ascertained through a profit analysis in the United States and Canadian newsprint industry, and profits in the two industries are then related to major economic causes and institutional characteristics.

The theory that the newsprint trade is largely the result of the economics of industry location, based in turn on comparative advantages enjoyed by Canada, was tested through profit analysis in the United States and Canadian newsprint industry. The underlying assumption is that newsprint is produced where comparative production advantages prevail when the product is sold largely in the same market at the same price. Until 1914, newsprint was the major paper produced in the United States, ranking slightly above board. In 1953, it ranked last, constituting only 4 per cent of total paper and board production. In Canada (from 1917 to 1953) newsprint has constituted about 80 per cent of total output.

In the United States newsprint production has lost greatly in importance and is almost entirely designated for domestic consumption. In Canada, newsprint has always been the most important product of the paper industry and has primarily been designated for export since 1917.



Regional Pulpwood Prices, United States and Canada, 1919-1953

International trade in newsprint

When newsprint production in the United States decreased sharply and consumption continued to rise it was inevitable that U. S. publishers would have to depend largely upon foreign sources of supply, chiefly Canada. Although in 1909 imports were less than 2 per cent of total conumption, by 1920 they had climbed to 31 per cent; by 1935 to 66 per cent, and by 1946 to 82 per cent, the highest percentage of domestic total consumption ever imported. Imports from Canada decreased to 80 per cent in 1953.

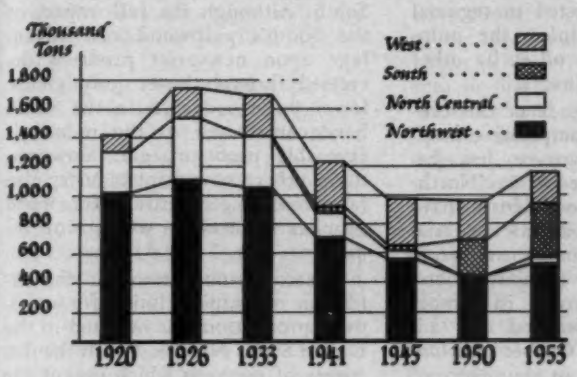
The U. S. newsprint import pattern is as follows: Canada and Newfoundland supply 95.7 per cent; Finland 2.7 per cent; Sweden 1.1 per cent; Norway 0.3 per cent; all others 0.2 per cent.

Canada's newsprint industry enjoyed a sizeable profit margin over that of the United States from the end of the first decade of this century to the 1930 depression and again after World War II until 1953. These were times of favorable demand and price conditions for the newsprint industry. Although over-all comparative production advantages did not belong to the Canadian newsprint industry at all times, Canadian newsprint exports to the United States almost constantly increased in relative importance in terms of total United States consumption between 1920 and 1953. Under less favorable demand and price conditions United States newsprint profits were above Canadian newsprint profits and comparative production advantages belonged to the United States newsprint industry. This was largely accounted for by relatively greater economic burdens and limitations on the newsprint industry in Canada than in the United States. Significant increases in overhead costs with declining operating ratios constituted heavy economic burdens for the Canadian newsprint industry during periods of demand decreases. Serious limitations upon the conversion to other lines of paper and board production existed because of domestic demand conditions and the United States tariffs on other papers and board, both significant factors influencing Canada's advantages in newsprint production. In the long run, however, the inevitable risk involved in large-scale, one-type production tends to be offset by relatively higher profits when demand and price conditions are favorable.

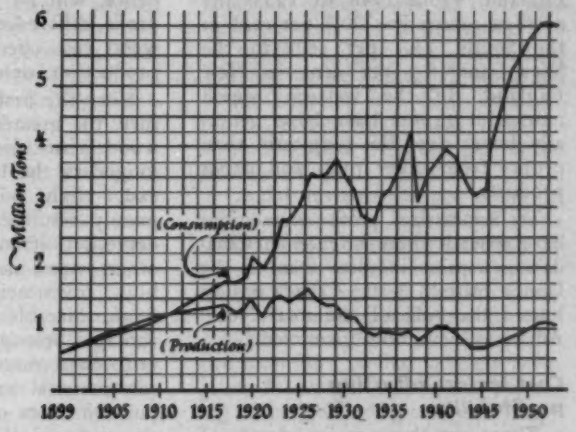
A new profit period began with the end of World War II. As wartime controls were lifted, demand for newsprint and other paper and board products increased sharply. This change was felt in all industries simultaneously. The most significant change occurred, however, in the Canadian industries. Newsprint profitability was higher in Canada than in the United States by 1946; by 1948, average profits in the Canadian newsprint and total pulp and paper industry were higher than in the United States. Since 1948, Canada's newsprint industry has gained the highest profit level over other production lines.

Regional profit figures are difficult to obtain in the United States newsprint industry. Profits for one company in each region showed the highest rate of return in the South,

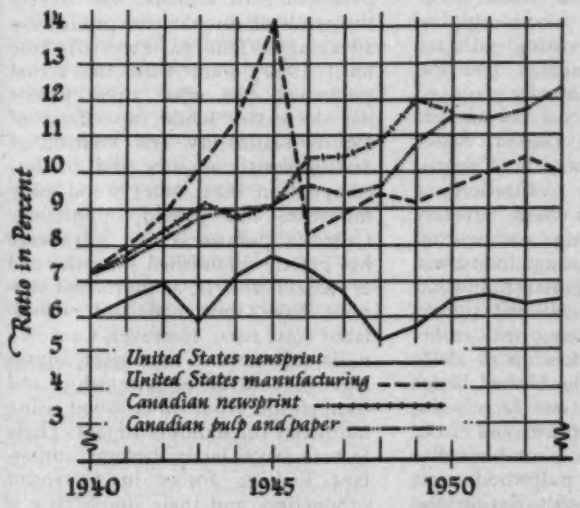
*From a thesis submitted by Hans Günter Brandes in partial fulfilment of the Ph.D. requirements at the College of Forestry, State University of New York, 1955.



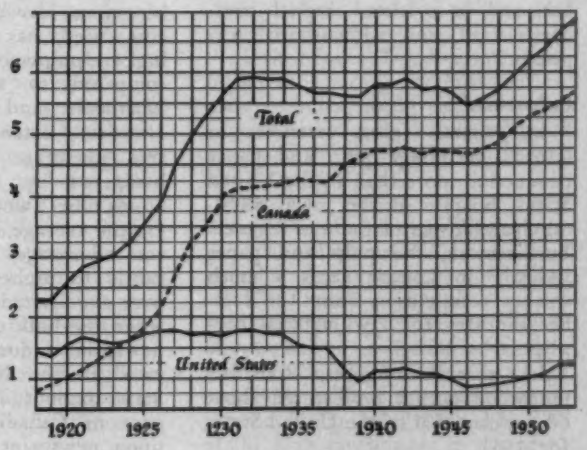
Regional Changes in United States Newsprint Capacity, 1920-1953



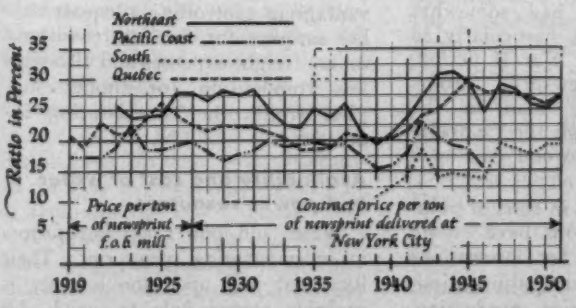
United States Production and Consumption of Newsprint, 1899-1953



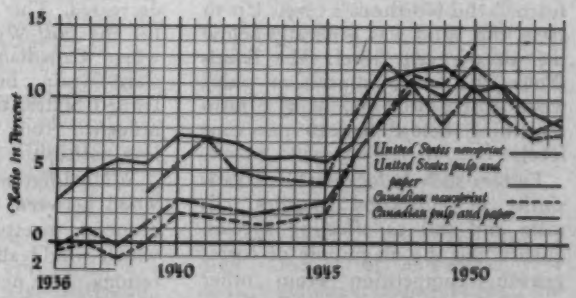
Ratio of Depreciation to Net Fixed Assets (by industry), 1940-1953



Newsprint Capacity, United States and Canada, 1918-1953



Ratio of Pulpwood Price per Peeled Cord (FOB mill) to Price per Ton of Newsprint (by regions), United States and Canada, 1919-1951



Ratio of Net Profit to Total Assets (by industry), 1936-1953

followed by the West and New England. From 1946 to 1953, the average return was 20.7 per cent in the South, 13.4 per cent in the West, and 8.9 per cent in New England. In the western region newsprint profits have been generally lower over the long-term than profits from other pulp and paper products.

To summarize, profit expectations have generally been brighter in Canada's newsprint industry than in the United States'. Hence, Canada has attracted the bulk of the total North American newsprint investment.

Cost factors affecting profitability

There are three major classes of cost items in the manufacture of newsprint: materials, conversion, and overhead. Wood is the most important single element in the materials class, as well as among cost items as a whole. Major items in conversion are power, fuel, and labor, and in overhead, capital costs, depreciation, and administrative expenses.

Pulpwood

In general, forest resources in Canada encourage pulp and paper production more than in the United States, because of the given physical characteristics of the tree resource. Furthermore, the pulp and paper industry in Canada faces a much weaker competition from the lumber industry for raw material supplies.

In absolute figures, Canada's pulpwood output represented about 60 per cent that of the United States for 1951.

In terms of the ratio of the cost of pulpwood to the price of newsprint from 1919 to 1951, the Northeast's ratio was generally above 25 per cent, while Quebec operated at slightly above the 20 per cent level until World War II, but since then has reached the Northeast's level. Up to 1938, the West was generally below the 20 per cent level. The South shows the most impressive pulpwood cost advantage, with a ratio remaining below the 20 per cent level.

Factors such as location and availability of pulpwood supplies, climate and soil as affecting species, quality and the magnitude of forest growth, competition from other wood-using industries, and forest ownership exert an influence upon newsprint profits. The net effect of these factors is reflected in regional differences in pulpwood costs, and, hence, will be reflected in regional profit differences, unless the pulpwood cost effect is offset by other production determinants.

Since the first decade of this century, the greatest comparative pulpwood cost disadvantage has belonged to the United States Northeast. High pulpwood costs have mainly resulted from raw material depletion, strong competition from other wood-using industries, and high investment costs in timber lands. Sizeable pulpwood cost advantages belong to Quebec and Ontario on account of an abundance of raw material supplies, limited competition from other wood-using industries and the control of future pulpwood supplies without undergoing large investment costs. Lately, eastern Canadian pulpwood cost advantages have diminished in comparison to those of the United States Northeast, because wood supplies with proximity to existing mills are becoming less abundant. The Pacific West has generally enjoyed higher pulpwood cost advantages compared to the United States Northeast and Eastern Canada. However, extensive realization of this advantage has been severely hampered by strong competition from other wood-using industries. On the average, Canadian pulpwood cost advantages contributed significantly to higher newsprint profits over the United States up to 1913, when the bulk of the United States newsprint industry was largely located in the Northeast and Lake States regions. The favorable influence of Canadian pulpwood costs upon newsprint profits during the 1930's and throughout World War II did not show up in higher profits over the United States, because of the countervailing effect of other production determinants. Also, Canada's pulpwood cost advantage over the United States had somewhat decreased. This was particularly so for the post-World War II period, when Canadian newsprint profits were again higher than in the United States, though the favorable influence from pulpwood costs was less noticeable.

Wide differentials in costs of pulpwood between regions have caused economic pressures for innovations which would alleviate pulping limitations for newsprint production. The first such innovation came in 1939, permitting the utilization of Southern pines. Since then, regional pulpwood cost advantages have altered significantly in favor of the South. Although the full impact of the South's pulpwood cost advantage upon newsprint profit is decreased through lower pulp yields, lower pulpwood costs in the South have contributed to the industry's favorable profit margin. However, the Southern newsprint industry also faces strong competition for wood supplies from other wood-using industries.

A second innovation for the extension of pulping limits for newsprint production was initiated in the United States Northeast with the discovery of methods which permit the utilization of the abundant hardwood resource. This will undoubtedly have a significant impact upon future newsprint profits.

To summarize, Canadian pulpwood costs support the hypothesis that the movement of newsprint production to Canada was largely the result of comparative production advantages. This was especially true until 1930; since then the actual pulpwood cost effect upon profits has decreased, while the effects of future availability and control of raw material supplies and of less competition from other wood-using industries has gained importance. Canada's pulpwood cost advantage has greatly diminished since the end of World War II, as pulpwood supplies have shortened and woods-labor costs risen. However, Canadian mills still hold a significant advantage in control or ownership and competition from other wood using industries for standing timber. These factors have lately become important limiting forces in newsprint production, and their significance is likely to increase even further in the future. Here, Canada is highly favored over the United States. Therefore, Canada's partly diminished pulpwood cost advantage is considerably bolstered by her advantage in controlling adequate timber supplies for the future without undue freight expenses and also with less competition for timber supplies from other wood using industries.

Availability and cost of water and power resources

Water and power are key factors in manufacturing newsprint. Their locational pull upon the industry is probably second only to wood. All paper mills require enormous quantities of fresh water of good quality and free from minerals. In 1950, a southern newsprint mill used an aver-

age of 30,000 gal. per ton of newsprint, while some paper mills frequently require as much as 150,000 gal. per ton.

Production of mechanical pulp requires 60 to 100 hp per ton of pulp for the grinding process alone. Newsprint mills, therefore, are particularly in need of low-cost power. Most newsprint mills in Canada and the United States, with the exception of those in the southern United States, are using water power which is self-generated.

In general, the availability of sufficient water and low-cost power has influenced the location of newsprint mills and, therefore, affected newsprint profits. Canada has enjoyed a plentiful supply of good quality water and economical hydro-electric power sites in close proximity to the location of pulpwood supplies. A somewhat similar situation has prevailed in the United States Northeast and Pacific Northwest. The relative profitability of Southern newsprint producers compared to these other regions has been favorably affected by the substitution of gas, coal, and non-privately generated power for company-owned hydroelectric power stations. Because of difficulties regarding future water-power expansion in the United States, Canada may obtain a considerable advantage in future power expansions, assuming that development of the extensive Canadian hydroelectric potential becomes economically feasible.

Labor costs

Labor costs per unit of output are extremely high in the newsprint industry. This is surprising in view of the fact that it is a large-scale and greatly mechanized industry with high capital investments.

Analysis of detailed cost data of selected United States and Canadian newsprint mills for nine months of 1949 indicates significant regional differences in labor cost per ton of unfinished newsprint. The average weighted labor cost per ton amounted to $5.05 for the three United States mills located in the West and to $3.21 for the six Canadian mills, five of which were located in the East and one on the Pacific Coast. In other words, Canadian costs per ton were only 63 per cent of those for the United States.

A productivity study of United States pulp and paper mills in 1951 indicates distinct regional differences for the newsprint industry. Direct man-hour requirements per ton of newsprint differed greatly for each region: 1.08 hrs per ton of newsprint for the South; 3.65 hours for the Pacific West; and 5.87 for the Northeast. Productivity is greatly affected by the speed and width of paper machines. The average speed was 1200 fpm in the South, 1100 fpm in the West, and 625 fpm in the Northeast. Similar differences showed up with respect to newsprint produced per inch of machine per day. The South produced 1.122 tons; the West, 0.601 tons, and the Northeast, 0.320 tons. These data show that productivity was highest in the South and lowest in the Northeast.

When these differentials are related to those for hourly earnings for 1952, the South had the greatest production advantage in labor costs due to highest productivity and relatively low wage rates; the wage rate disadvantage in the West was lessened by relatively high productivity, and the wage rate advantage in the Northeast was more than offset by low productivity.

No similar productivity study could be obtained for Canadian mills. A rough indication for productivity or relative productivity levels can be obtained by comparing average widths of paper machines and sheets. In 1953, 78 per cent of all paper machines in Canada manufactured an average sheet width of 158 in., while 47 fourdrinier machines in the United States, or 96 per cent of all paper machines in the newsprint mills, averaged 153 in. in width. This would indicate a higher productivity level in Canada.

Canadian newsprint mills on the whole have held a comparative production advantage in labor costs compared to United States mills from the 1920's to recent years. Relatively lower wage rates and high productivity were the main sources for this comparative advantage.

Western United States and the eastern Canadian mills had approximately equal labor costs in the 1920's, but by 1949, eastern Canadian mills had established a comparative advantage over western United States mills. The United States Northeast had the greatest comparative disadvantage in labor costs in the 1920's and has held it ever since. However, southern United States mills appear to have had the greatest comparative advantage in labor costs among all production areas. This comparative advantage is largely attributed to relatively low wage rates and high productivity.

Capital costs

Capital costs in the newsprint industry are extremely high. For a Southern newsprint mill completed in 1949, capital investments amounted to $80,000 per ton of daily capacity, exclusive of working capital, timberlands and power plants. In 1950, construction costs for a newsprint mill on the West Coast were estimated at $90,000 per ton per day. If wood and power supplies had been included, capital investments would have increased to about $130,000 per ton on the West Coast.

Capital investments per dollar of sales are extremely high in mills producing solely newsprint. A study by the Security and Exchange Commission in 1948 revealed that the investment per hundred dollars of net sales amounted to $110.00 and $97.00 for two companies producing solely newsprint, $56.00 for a company producing 35 per cent newsprint, and $45.00 for a company producing 45 per cent newsprint.

There has been a comparative strong reliance upon bond financing in the Canadian newsprint industry, which resulted in sizeable cost advantages during the first large expansion period in the 1920's. Capital costs incurred through bonds tended to be lower for Canadian expansions than for those of the United States. The disadvantage of higher capital costs for industrial expansions in less mature economies than paper does not seem to have hampered movement of the newsprint industry into Canada.

Generally, lower capital costs through bond financing in the first great Canadian newsprint expansion period tend to substantiate the hypothesis that the movement of newsprint production to Canada was the result of comparative production advantages over the United States. In view of the magnitude of Canadian newsprint expansion during the 1920's and because of the high investments in the newsprint industry, it can be inferred that relatively lower capital costs of the major portion of the total capitalization significantly contributed to Canadian newsprint expansions.

No specific conclusions can be made for the post-World War II expansion period in the United States and Canada. Sufficient information on capital costs could not be obtained. However, the importance of capital costs through bond financing decreased for both countries because of an increased reliance upon internal capital sources for newsprint expansions.

Transportation costs

Transportation costs comprise a high proportion of the product value and are significant in determining competitive marketing ability of production regions.

Rail transportation is the major type of shipping for newsprint from pro-

duction to consumption centers. In 1949, rail accounted for 75 per cent of shipments and water for only 25 per cent in Canada.

Strictly on the basis of average transportation costs per ton of newsprint, Canadian mills generally faced higher transportation costs than United States mills. Consequently, the former were at a relative competitive disadvantage, and transportation costs reduced Canadian industry profits proportionately more than United States profits. However, the effect of the transportation costs on the profits of the Canadian newsprint industry was offset by over-all comparative production advantages until the 1930 depression and again after World War II. This is reflected in higher Canadian newsprint profits relative to United States profits. For the remaining years between these two periods, however, Canadian profits were on a lower level than the United States profits, which indicates that the effect of higher transportation costs was not fully offset by other production determinants. Thus, when considering transportation costs alone, they do not support the hypothesis that Canada enjoys a comparative production advantage over the United States. However, the effect of transportation costs was not great enough to impair the validity of the hypothesis in times of favorable demand and price conditions.

The role of transportation cost for Canadian newsprint mills is considerably altered through Canadian ability to penetrate distant markets by freight absorption under existing pricing conditions. This may be viewed as an advantage for Canadian firms located at a considerable distance from major consumption centers, assuming that the more distant firms are able to absorb relatively higher transportation costs on account of the economies of location, technology, etc.

Western and southern United States newsprint mills do not sell (except perhaps in insignificant amounts) in the major newsprint markets in the eastern parts of the United States. They sell primarily to local markets, which gives them a transportation advantage. The same situation prevails for western Canadian producers selling in the western United States newsprint market. The location of southern and western United States newsprint mills is greatly influenced by the zone pricing system and comparative transportation advantages in local markets. Should these mills sell in the major eastern United States newsprint market, the transportation advantage would be lost and hence their over-all competitive strength decreased. Production expansion in the South and West is, therefore, not unlimited, but primarily dependent upon future potentialities of local markets.

Investment climate

Among the institutional factors analyzed, corporate taxes were found to favor the Canadian newsprint industry. The over-all federal corporate tax climate in Canada in the 1920's amounted to an additional advantage for expansion of the newsprint industry in Canada rather than in the United States. Relatively low corporate tax rates in Canada contributed to higher Canadian newsprint profits. Although this favorable effect upon Canadian newsprint profits has been diminishing, it still exists to some extent. The concentration of American capital in the Canadian newsprint industry is a strong indication that Canada has afforded stockholders a more favorable investment climate for newsprint production than has the United States. This can be attributed partly to Canadian practices regarding the distribution of retained earnings and to the fact that Canada has never had a capital gains tax.

Behavior of the exchange rate between the Canadian and United States dollars has frequently accentuated Canada's comparative production advantage. The traditional discount selling of the Canadian dollar in terms of the United States dollar has had a favorable effect upon Canadian newsprint profits. Hence, the discount selling has been in full support of the hypothesis that Canada enjoys a comparative production advantage. The premium selling of recent years has, however, been costly to Canadian producers and has exerted an adverse effect upon Canadian newsprint profits. Should a return to the traditional discount materialize in the near future, as is expected, then future profits will again be more favorably affected.

United States newsprint tariffs and Canadian pulpwood export embargos are of particular importance. The absence of the United States tariff on newsprint and the existence of one on other papers and board is perhaps the most significant single factor in Canada's comparative advantage in newsprint production. When newsprint imports from Canada were dutiable, tariffs on newsprint were more or less prohibitive in nature and protected the United States newsprint producers from foreign competition, as tariffs on other papers and boards still do at the present time. With the elimination of newsprint tariffs in 1911, the Canadian newsprint industry enjoyed a great comparative advantage over the United States, and Canadian newsprint profits went above those in the United States. On account of the continuing United States tariffs on other paper and board, Canada has not been able to compete in these products in the United States.

Interest groups in the United States have suggested the imposing of a tariff on newsprint in order to solve supply difficulties once and for all. Though such action would probably encourage United States production, it would also raise the price of the newsprint and shut off Canadian imports severely, and not necessarily increase the total supply.

Although existing newsprint mills in the United States Northeast have successfully withstood Canadian competition, they are no potential competitor for Canada's newsprint industry based on the conventional source of raw materials. Further expansions in the Northeast are limited, because of the difficulties in obtaining a supply of low-cost softwoods. However, the latest expansion program, based upon the utilization of hardwoods by the largest newsprint producer in the Northeast may give Canadian mills noticeable competition. Though northwestern and southern United States newsprint mills have captured local markets, their significance as a potential competitor for Canadian newsprint mills is limited. It is true that the southern and northwestern United States are currently enjoying a small bonanza of newsprint investments. The advantages that have spurred these local investments are likely to run out with the satiation of local markets where transportation costs deter competition of eastern Canadian mills and afford local mills sizeable cost advantages.

Should these mills attempt to compete extensively in the major eastern United States market, they not only would lose the transportation cost advantage, but also would have to cope with strong competition from other wood-using industries for raw materials. Presently realized sizeable newsprint profits by western and southern mills are, therefore, no indication that these mills will become generally important competitors for Canadian newsprint mills. Hence, the United States is likely to continue to obtain the greater portion of her newsprint supply from Canada, in order to meet her demand increases, as Canada's comparative advantages over the United States newsprint industry bids fair to continue in the future.

New markets for paper

– to increase sales volume and improve earnings*

CLEM W. KOHLMAN
Industrial Chemicals Div.
American Cyanamid Co.

THE STATEMENT, "in a changing and uncertain world the only safe thing to do is to study consumer tastes and trends, to push research and to strive vigorously to grow" (Sumner Slichter of the Harvard Graduate School of Business Administration) represents the most practical application of modern business philosophy. This means that to grow you must look vigorously for new markets, and that in order to sell these new markets you have to research not only your immediate customer's needs, but also the ultimate consumer's needs and desires.

So, we — a chemical company — in order to sell more paper chemicals took a long look at the paper mill, at the paper converter, the paper merchant and the consuming public. We came to the conclusion that the biggest potential new markets for paper could be opened by taking full advantage of the quality of wet-strength.

Wet-strength promotion— a case history

In 1952 we turned up a startling fact about wet-strength: the great American public didn't even know it existed. We visited grocery, drug, stationery and novelty stores up and down the Atlantic Seaboard. Every one of these had wet-strength paper products of one kind or another, but we did not find a single sales clerk or manager who even knew that he had wet-strength paper products on his shelves, and only a few who knew what wet-strength could mean to the consumer.

Wet-strength was our baby. American Cyanamid had developed in 1942 the first commercially practical method of making paper strong when wet. So it was suitable and proper that we should take on the job of kicking off an educational program to acquaint individual consumers and corporate customers with the tremendous unrealized potential uses for wet-strength paper.

The process had, of course, been used widely during the war years for defense purposes — combat maps, paperboard boxes for overseas shipments, identification tags, and many other uses. In peacetime, civilian uses and markets had been developed — industrial towels, potato bags, photographic and blueprint papers were among the items that accounted for millions and millions of pounds of wet-strength paper. But despite this usage we found out that consumer knowledge of wet-strength was nonexistent. In researching among back numbers of America's publications, for example, we found that, with the exception of two or three early mentions, nothing had appeared in print outside of the paper trade publications.

So with the cooperation of 26 leading paper mills and converters we held a press demonstration to enable editors to see for themselves the modern miracle of paper that would retain much of its strength even when wet. The editors came — some 75 of them — and were deeply impressed.

The mind stretchers that were subsequently reported in the press resulted in literally hundreds of inquiries. Concessionaries renting bathing suits at public beaches wanted to replace their fabric bathing suits with disposable paper suits; rain coat manufacturers, vendors of scholastic caps and gowns, apron, hat, dress, skirt, underwear, sock and shoe manufacturers — all were asking for information about wet-strength paper. Of course, we had to tell them that paper suitable for most of these uses was still in the future. At the rate mills have been working on this problem of fabric substitutes for garment use, however, it may not be long before the problem is solved.

But more immediately important, throughout industry executives wrote in suggesting hitherto untried uses for paper, asking for mills that might supply them. These requests ranged from wet-strength labels for soft drinks to smocks for factory workers, and for most of these industrial uses it was possible to find a practical wet-strength paper.

These letters continue to come in and to be referred to the mills. We have continued to work with the press, supplying news about paper and wet-strength paper to editors. In 1954 we did a half-hour television show — "Life With Paper" — that played 50 stations. Currently, 12 prints are being circulated for community, business and club showings, and we are booked two months ahead at all times. This too has meant more interest in paper for new uses.

What are the results?

Probably you are asking just what this has meant in terms of sales? To us it has meant a tripling of Melo-strength resin sales to paper mills for civilian uses in two years. And the mills have been putting that increased amount of resin into paper that goes into specialty items. And specialty items are responsible for the larger share of your profits.

How does our experience fit your problems? Ninety per cent of you say that competition is increasing. We had tough competition in the paper chemicals field. Our competitors were cutting prices. You tell me your competitors are cutting prices — particularly those cross-channel competitors such as grocery wholesalers, office supply houses, and so on. In the words of one paper merchant, "My customers want me to work on a 2- to 5-per cent markup, and that isn't possible! You couldn't even put paper in and out of a warehouse on conveyor belts on such a markup!"

I interpret this to mean that you are, too frequently, being forced to sell on a price basis. After all, if 100 merchants are supplying exactly the same commodity, will the customer not always force the lowest possible price?

But when you offer something unique — a plus value that cannot be offered by everyone, something that has demonstrated value to the customer, you can ask for and get a reasonable markup.

Wet-strength can be such a plus value — particularly if it is a quality wet-strength with a brand name that assures performance beyond the average. For example, take freezer wrap paper.

*Abridged from a paper presented at the convention of the National Trade Association in Chicago September 21, 1955.

No housewife is happy if, when she pulls the freezer paper wrapping off the steak, shreds of paper cling to the meat. But if it is wet-strength, the wrap will not shred off.

No meat packer is happy if he finds that the wet-strength resin in the papers he is using is destroyed by the amino acids of the meat. But if he uses a melamine wet-strength wrap, such as Melostrength paper, he knows the resin resists acids, and that it is backed by the approval of the U. S. Food and Drug Administration.

The list of consumer items deriving advantages from wet-strength is a large one, and the advantages from melamine wet-strength is even longer. These include paper table cloths, tissues, household toweling, napkins, garbage bags, tarpaulins drop cloths, labels, giblets and dairy wrap, bath mats, guest towels, hospital bed pads, medical face masks, wall paper, fruit wrap, waste containers, industrial wipes, ice bags, produce bags, etc. For every one of these items and a host of others, wet-strength offers plus values.

Moreover, wet-strength is just the starting point. Associated with it are:

Increased fold endurance, resistance to scuffing, resistance to linting, resistance to acids, resistance to weather, and reduced bleeding of colors in wet papers.

When these plus values are translated into practical benefits for the customer and the consumer, you have sales arguments that help to jog the customer's mind and imagination away from that everlasting, "How much will it cost me?" to "What will it do for me?"

How does this apply to the fine paper merchant who may not handle wrapping papers? Well, don't you too have the problem of getting the customer to think in terms of, "What will this paper do for me?", rather than just the price?

The tremendous improvements made by the mills in printing papers, particularly for letterpress, and the many new varieties of papers available should provide your salesmen with plenty to talk about besides "how much?" The principle is the same. You too must sell plus values.

But of course the speed-up in printing processes and the tremendous expansion in offset lithography have given you new problems, too. To me, your answers in regard to printers' complaints were fascinating and challenging.

We have, for some time, been investigating some of those problems. It seems possible that the same melamine resin used to get wet-strength may well be able to go a long way toward solving some of these customer complaints.

For instance, you agree that complaints about curling are most frequent. Also frequently mentioned was the problem of shrinkage and expansion. These undesirable qualities in paper frequently relate to how long the pulp is beaten — and beating, of course, makes the paper stronger.

But if melamine resin is added to the beater at the paper mill, this strength can be achieved with much less beating of the pulp.

The result of the use of melamine to reduce beater time as reported by the U. S. National Bureau of Standards shows that curling, shrinkage, and expansion were reduced by one-half.

Next most frequent complaint was picking. Again, as reported by the U. S. National Bureau of Standards, the use of melamine resulted in a nine-point increase in resistance to surface pick. This, of course, is a substantial increase in pick resistance. Other advantages also gained include improved opacity, improved oil absorption, and folding endurance increased many times. Do you think your offset customers would be interested in paper with these improvements?

New markets of the future

I made a prediction last year in an article published in the *Journal of Commerce* that by 1980 annual consumption of paper in the United States (which is now 393 pounds per person) would reach 1000 pounds per person. I have been asked by a number of people how I think this is going to come about.

Some of this will come from our increasingly high standard of education, which has always shown a close correlation with the use of paper. Advertising use of paper per capita will continue to increase. Our increased leisure time will increase our recreational and self-improvement reading time. With growth of self-service there will be a vast increase in small unit wrapping and packaging. Our concern with higher standards of sanitation will increase the use of protective and cleaning papers.

But two great relatively new markets will be most important.

Automation is dominating the thoughts of every production engineer and many executives today. So far, little thought has been given to its effect upon paper consumption.

Consider that when you remove the man-power from the plant you also remove the recording device of man's brain. Man's memory must be replaced with automatic recording devices, and they will set down their records on paper of some variety — perhaps a type of paper that has not yet been invented.

The second great area of new paper use will be as a substitute for textiles in garments. This seemed a fanciful idea only two years ago, when we introduced a paper bathing suit. But actually paper has, for a decade, been moving into the traditional textile markets — the fabric shipping sack is already almost as extinct as the dodo. The use of paper napkins is sharply increasing.

Perhaps the chief factor that leads me to predict vast consumer demand for paper garment items is the high cost of consumer laundering today, and the unwillingness of the modern housewife to spend her time on monotonous, repetitious chores such as washing or ironing. In the textile field the hottest sales item is the fabric that needs no ironing. The paper industry can go one step further to the garment that needs no washing — just throw it away.

Paper, of course, cannot have the drape, the texture, the quality of textiles.

As a nation we have proved a hundred times that we will accept substitutes when they have practical advantages. I believe we will accept paper garments for many uses. And a practical paper for this purpose is not far away.

I have seen such a paper — soft, strong, free from noise and strong when wet. It is still in the testing stage at one of our great paper mills.

I have seen a strapless evening gown — made of nothing but paper — soft paper that is strong when wet or dry.

I have seen paper bed sheets that keep their strength when wet. A Midwestern hospital, experimenting with these sheets in place of textile and rubber, reported that in every case where paper bed sheets were used, bedsores were cleared up in 36 hours, and patients who had the paper sheets refused to switch back.

I have seen a paper mail sack of wet-strength paper reinforced with fiberglass. Perhaps this use for paper suggests other market possibilities to you as it did to the man who is experimenting now with this paper for glider wing coverings.

These are examples of the developing markets for paper that meet human needs. They are markets that spell new sources of profit to paper merchants.

Technology and trade*

MOST DISCUSSIONS of trade seem to swing inevitably to the tariff, and the atmosphere in which it is discussed is one frequently clouded by emotional overtones. Arguments presented both by free-trade and protectionist proponents show a proneness to generalization, an unwillingness to yield an inch. For even the terms "free trader" and "protectionist" have become fighting words, both having lost their original clear meaning. To a protectionist a free trader is one who wishes to sell his birthright for the proverbial mess of pottage. To a free trader a protectionist is one who wishes artificial insulation against the hazards of competition. Such an approach is surely not conducive to understanding a complex subject. One would hope that if the argument could be carried on with good will and with recognition that there is no easy or absolute answer, a moderate middle ground might be found not too distasteful to either side.

I cannot promise to bring clarity to this very turbid subject. I can, however, present the viewpoint of a businessman who has seen consequences on both sides of the question in his own company. For trade barriers abroad are barriers to the growth of the Du Pont Company's export business, and tariff reductions in the United States can have far-reaching effects on certain elements in our domestic business. This duality of motivations leads certainly to schizophrenia, but perhaps also to a more objective viewpoint, since self-interest is tugging in both directions at once.

What does "free trade" mean?

The term "free trade" has, of course, a fine ring to it; and, in an ideal and peaceful world, no one could seriously question its merits. Certainly no American can advance that argument since he has seen free trade in one great area, the United States, do so much for his fellow citizens. Free trade in the world at large is, however, a purely theoretical concept, much like saying that since the world would obviously be better if there were no sin, we should therefore abolish or reduce progressively all of the forces that maintain law and order.

If trade is to be truly free on a world-wide basis, certain conditions would appear to be essential. We must assume first a state of grace in which mankind will no longer be harassed by war. We must assume, second, that nations entering into trade on a free basis have more or less equal wage and price structures; otherwise, reciprocal advantages would be hard to establish. We must assume, finally, mutual responsibility of government, so that agreements will be honorably executed and guaranteed. We must assume a devotion to principle so that trade can be conducted in an environment of trust and confidence.

Unfortunately, the world today is neither ideal nor peaceful. We have tensions between nations that make it necessary for each to live in an armed camp—to promote national self-sufficiency, cost what it may. We have also living standards from nation to nation that run the gamut from bare subsistence to luxury.

If freer trade were simply to increase the competitive forces in our various national economies, no one could quarrel seriously with the result. There is no doubt at all that fair competition, whatever its source, is in the public interest.

Unfortunately, competition between nations is not so simple, since differences in living standards, hence labor costs, will bring results far more explosive than competition in the sense in which we usually think about it.

Intertwining of technologies and industrial interdependence

There is an aspect to the question that is not often presented. This relates to the intertwining of technologies in our present complex industrial scene—to the interdependence of one branch of industry on another—and finally, to the impact of a lost technology on the remainder of our industrial potential.

Years ago each major industry stood essentially on its own feet, fully integrated and relatively independent of activities in other industrial areas. Steel was steel, wood was wood, cotton was cotton, and the choice to the consumer was limited to a few fairly specific items. In recent years, however, this industrial and technological autonomy has virtually disappeared. There is scarcely an industry, scarcely a product that is not vitally dependent on the contributions of not one but of many quite different and, on the surface, unrelated technologies.

Our industrial progress is dependent upon the whole of our technological competence, hence loss of any major segment of industrial skill would have far-reaching effects not only in its particular area but over the entire industrial scene.

If an important branch of commerce is destroyed through foreign competition, it is obvious that we lose also not only the technology associated with it but more importantly the incentive for research and development — a loss we could not afford. For the impact of one technology on another cannot readily be effected at long range over barriers of language and national predisposition. It requires, rather, close personal contact, a clear and mutual understanding of the problems to be solved, the potential means for doing so, and finally the patient cooperation that will lead finally to the successful fruition of a new development.

We welcome competition because of the necessary discipline to which it subjects us, and because only through a fully competitive system can industrial progress be accelerated. Certainly, we have plenty of domestic competition in all of the industrial areas in which we engage. We would welcome foreign competitors as warmly were they to bring their technology to the United States, build plants there and operate them with United States workmen at United States wage rates. We do not, however, like to run the business race with one hand tied behind our back, and this is what we face when we meet competition that has behind it standards of living and wage rates far below those we enjoy at home.

Is free trade possible?

The essential conditions of free trade must be a peaceful society, a more or less parallel wage structure, a mutual responsibility of governments, and a common standard of business behavior.

Is there any international relationship in which such conditions can be met? Certainly they are few and far between. Yet there is one where the factors which militate so effectively against free trade elsewhere are almost nonexistent. That is the relation-

(Continued on page 853)

*Abridged from a speech made by Crawford H. Greenewalt, president of E. I. du Pont de Nemours & Co., before the Canadian Chamber of Commerce at Winnipeg October 4, 1955.

Core material can be spliced. Knife cuts material evenly, then two cores are lapped and spliced by compaction of the hydraulic ram, background

Core material can be bonded into a blanket whose size is limited only by width of the bonding machine. Note how one man can handle this large blanket

New ways to fabricate panels from honeycomb cores

JAMES JOSEPH

This article describes how Douglas Aircraft makes, saws, sands, shapes, splices and sonic-tests honeycomb cores used—in this instance—for the fins of the Nike missle

DOUGLAS AIRCRAFT CO. INC.'s "Aircomb" division at Bell, Cal., has found new methods for fabricating, bonding and testing panels cored with its phenolic resin-impregnated honeycomb.

Importantly, the division is producing resin-impregnated kraft paper honeycomb — its "Aircomb" — with mill-run thickness tolerances of .010-inch. For fins of the Nike missile, the division has rigged three bandsaws along a continuous belt, each saw cutting a different angle in the honeycomb blanket, contouring it to fit aluminum facings. Douglas is sawing, sanding, shaping and splicing honeycomb coring.

It has installed a unique sonic-test chamber where the internal bond between facings and cores are inspected, keyed to high-decibeled audio frequency vibrations.

Outcome of all this advanced engineering and shop practice is "Aircomb", which Douglas claims is "the strongest material in relation to its weight now being manufactured."

Kraft paper — the starting point

Let us look in on the process. The honeycomb structure begins as either 60- or 125-lb., 18-in. wide kraft paper. 650-lb. rolls of long-fiber kraft paper are first run through a glue-line (or "node-line") applicator where a phenolic, water-soluble, thermosetting resin (perhaps Amberlite PR-14) is applied in 125-in. wide, .007-in. thick lines on both sides of the paper. Nineteen lines are laid longitudinally (and continuously) along the "front" surface, 18 on the "back". Lines are staggered, a node line on the reverse side falling between two lines on the front.

From lining, kraft passes through a 150°F. dryer which evaporates water from the resin but does not cure it. Next, kraft passes a cutter whose heads slit the roll laterally into 3.2- to 6.4-in. folds (thus determining thickness of the honeycomb core). Slitters leave several uncut portions along each fold line ("tabs"), so roll remains continuous, although automatic folding produces a kind of stacked-fan. Following this, folded kraft is batched into carts, rolled into an automatic humidity-adjusting high-frequency dielectric oven (an 8-min. cycle at 100 psi, 300°F). "Curing" bonds the resin lines, producing a compressed honeycomb unit, anywhere from 3.2 to 6.4 in. thick, kraft-paper wide (18-in.) and 12 to 24 in. long. When glue-lines are cured — and bonded — the 60-lb. kraft has an expansion ratio of 40:1, while the 125-lb. paper has a 20:1 ratio. Thus, in the next fabricating step — expanding — a 12-in. long bundle of unexpanded 125-lb. kraft is stretched to 20 ft. This gives its characteristic, cellular honeycomb appearance.

Expanding involves two operators, using hooks. They grasp either end

Blanket is fitted into bonding jig, as another panel is put together

Core material as it is fitted with edges, one step in panel-making

Nike fin core material, in holding jig, passes into first of three contouring machines

Core material can be sawed-sanded like wood . . . as workman is doing here

Cut of the bonding machine —note finished panels faced with aluminum

Sand, lightly sprinkled over panel's surface, has been sonically disturbed to reveal shape and size of underlying flaw (sonic process is Douglas patented method)

of the compressed core and stretch it into a magnesium form (which may be 20 or 40 ft. long). Released, the honeycomb fits the form snugly, and since the form is 14.4-in. wide (compared to the compressed core's original 18), that is the new core width. Still in the form, the core is dipped in a resin tank, agitated (2 min. at 70°F.) and after another 2 min. of automatic shaking (to be rid of excessive resin), the form enters an 85-ft. oven, where the core is cured. Curing temperature is 300°F, the cycle varying between 12 and 18 min.

Result of these manufacturing steps is a phenolic resin-impregnated kraft honeycomb which, after five days' warehousing (to bring temperature/moisture to normal), is cut, sanded and faced.

Sawing of honeycomb

Even before being faced, "Aircomb" cuts like wood. Douglas uses a standard vertical bandsaw, either an Oliver or Do-All. Engineers have found a ½-in. six-tooth skip blade best for cutting 60-lb. kraft core; a ¾-in. four-tooth skip blade for the 125-lb. core. While thicknesses of ±.010-in. are "standard", cores are frequently finished to tolerances of ±.002-.003-in.

A soft rubber drive-roll (working from a Graham vari-speed motor, 0-30 fpm) presses the honeycomb against the saw's backplate. Usually the core is sawed slightly on the plus side, then sanded to tolerance. The sander is Douglas designed, using 60-grit paper, simultaneously sanding both sides at a 15-fpm rate.

Sawing of the contoured Nike fin core is interesting, in that it involves a special set-up and conveyor. The core rides a conveyor, passing three horizontally-operating bandsaws, each integrated with a sander. Each saw-sander unit cuts one of the fin's three angles (in the low order of 2 to 3 degrees).

Bonding of cores

The "Aircomb" division has faced cores with almost every type of skin, from wood through fiber-glass laminates, to steel.

Consider one application. The baggage racks in DC-6s were formerly made from five-ply (aircraft grade), in 9 to 10-ft. sections. By installation time, the plywood had too often warped, making installation difficult. Douglas faced a .090-in. core of "Aircomb" both sides with 3/32-in. three-ply. Now, with warpage eliminated (and weight reduced about 50 per cent), baggage racks are precision installed, saving hours of labor and giving a neater, stronger job.

In fabricating panels, a honeycomb blanket — material wide and unrestricted as to length — is made by bonding together, under heat and pressure, any number of core sections. Mating edges of the honeycomb are sprayed (using a standard paint-spayer) with a phenolic adhesive. Edges are held at contact pressure in a 300°F. oven for 18-20 min. While the adhesive is not at this point completely cured, it is firm enough for the blanket to be worked.

Honeycomb can also be spliced — a relatively simple job. Two pieces are cut with a large, manually-operated drop blade. Edges are overlapped about 1½ in., and one piece of honeycomb set atop the other. A plate, welded to an 18-in. air-actuated hydraulic cylinder, presses the overlapping cores together (200 psi), and they are mated. The splice is as strong as non-spliced areas. The finished 125-lb. kraft core weighs 3.6 lb. per cu. ft.; the 60-lb. core, 1.7 lbs. per cu. ft.

Bonding on of faces follows the same general heat-pressure technique: panels are built up in a form called a "bonding jig". First, the bottom face (wood, aluminum, magnesium, stainless steel, fiber glass or other material) is placed and sprayed.

Douglas favors, for exterior panels, a thermosetting resin adhesive. Most panel components are sprayed with adhesive prior to being placed in a bonding jig. Next, edge angles are inserted, these first preformed and sprayed with adhesive. After this, the honeycomb blanket is fitted to the form, often with help from "shoehorns" so that the core, purposely made slightly oversize, fits the form's contours snugly. Finally, the top facing is placed, having previously been sprayed. Then the form routes to the bonding press where it goes through a 25-min. bonding cycle. During the first 5 min., panel is held at contact pressure, but under 300°F. During the next 20 min., pressure is increased to 20 psi, under the same temperature. And the panel is ready for finishing, which may include edge sealing.

In applying adhesive, both core surfaces (top and bottom) are sprayed with from .1 to .112-lb. per sq. ft. of panel. Honeycomb usually gets about .015-in. over-all coating, while the facing gets .007-in. on its bonding side. Adhesive thickness, while fairly critical, is actually regulated by the speed of a conveyor through the adhesive-spray booth, where two spray-gunners stand, one on either side of the belt. Belt speed approximatees 10 fpm.

Sonic testing

Bonding is sonic-tested in a unique set-up. Involved are four audio speakers and a sound-proof room, 7 by 9 ft. and 10 ft. high.

The sonic-testing principle in brief: high-decibel audio frequency sets up vibrations. In a honeycomb-cored panel, the well-bonded areas vibrate least, while there is greater vibration where the bond is broken. This frequency difference can be made visual by sprinkling the panel's surface with a very thin layer of fine sand (sandblast type). Heavier vibrations in unbonded portions shift the sand — leave bare an area that is roughly the same shape and size as the underlying flaw. This is a Douglas patented method.

In practice, each side of the panel is separately sonic-tested.

The panel is laid on rubber rollers atop a box installed with four loudspeakers. Speakers are dynamic type, 4 by 6 ft. and paired. They are placed vertically, facing a metal deflection plate which concentrates their volume upwards, against the panel's underside. Vertical rather than horizontal placement prevents excess sand from fouling speakers.

Operator sifts sand lightly over the panel surface. Sand layer is thick enough to cover, yet light enough so that the panel's face barely shows through. Too much sand would not allow individual grains to vibrate (as they must), and would render the test inaccurate.

After sanding, the operator retires to a glass-enclosed, sound-proof control booth, installed with an audio oscillator and various audio amplifiers. Working at a preset volume, he tunes the oscillator through the audio range, beginning at the high-frequency side, about 15,000 cycles/sec. He works the controls slowly, taking about 3 min. to run from high-frequency to low (about 100 cycles) and back.

Meantime, the sound is booming against the panel's underside, setting up frequency vibrations within the panel, especially at the junctures of its core and facing (the rubber rollers, upon which panel rests, prevent entire panel from vibrating. Only unbonded portions react violently to the high-frequency sound).

From his booth, the operator can see the bare flaw places as sand shifts from them. The panel is then turned and the process repeated for the opposite side.

Douglas says sonic-testing unerringly pin-points unbonded areas, affords a quick, inexpensive test method. However, sonic-testing is not effective in spotting bonds which are merely weak or unstable.

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New results and ideas in alkaline pulping*

▶ The results reported by Peter B. Borlew of National Container Corp. suggest that Na_2S, and not NaHS, is the main pulping agent. If this is so, conditions should be sought that will prevent the hydrolysis of Na_2S which would also permit the use of low sulfidity cooks.

▶ An investigation reported by Victor F. Mattson, Mead Corp., shows that the organic materials in black liquor do not consume appreciable amounts of pulping chemicals. This is an important finding and should lead to more extensive practice of using recycled black liquor in sulfate pulping. There is, however, a disadvantage insofar as the organic materials in the black liquor affect the pulping process in such a way that the resulting pulps have increased permanganate numbers and lignin contents and decreased brightness and alpha-cellulose contents.

▶ A new concept in flow measurement has been introduced by Foxboro Co. with its magnetic flow meter. Its operation is based on Faraday's Law of Electromagnetic Induction. The voltage generated by the flow of fluid through the magnetic field is detected by two "point" electrodes, which are mounted flush with the tube interior through which the fluid flows. Consequently, there are no obstructions to the flow and no recesses, crevices or openings to catch particles in suspension. Accuracy is of the order of ± 1 per cent. The flow meter is available with a flow totalizer which records a precise count every 12 seconds. This meter should find an important application in the pulp and paper industry.

▶ In a study of comparison of sulfate pulps from mixed tropical hardwoods from the Brazilian Amazon with industrial kraft pulps from Southern hardwoods, Dr. Karl Lauer of the University of Alabama found that cooking hardwoods and coniferous woods together leads to inferior pulps, compared with mixtures of individually cooked pulps.

▶ Some kraft mills operate with 100-lb. salt cake makeup per ton of pulp. A. W. Pesch, International Paper Co., believes this to be an attainable average consumption of salt cake for kraft pulp mills in the near future. Average sodium recovery efficiency now stands at 90 per cent, with a few mills reporting an efficiency of 95 per cent; and average sulfur recovery efficiency in modern mills is 50 to 55 per cent, with some mills reporting a sulfur recovery efficiency as high as 75 per cent.

▶ Two-stage slaking seems to provide the best answer to the most difficult and troublesome step in continuous recausticizing, according to D. C. Gillespie of Dorr-Oliver Inc. The advantages in the two-stage system lie in (1) permitting the leveling out of kiln surges and aiding in control of causticity by providing additional detention time for slaking; (2) eliminating the need for green liquor heating, since the heat of reburned lime directly from the kilns plus the heat of reaction is sufficient to keep slaking temperature above 200° F., and (3) reducing hot lime handling.

Satisfactory grit removal from the primary slaker is best achieved by gravity flow and continuous recirculation with intermittent purging. Where gravity purging is not feasible, the primary slaker can be provided with a continuous grit removal system consisting primarily of a stainless steel slurry pump with a semi-open impeller for continuous pumping of grit to a point behind an overflow baffle in the primary.

▶ A practical means of applying the concept of "specific filtration resistance" to the evaluation of the extent of mechanical treatment of coarse pulps was proposed by W. W. Marteny and K. E. Olson of National Container Corp. The method is particularly adapted to very coarse stock for which conventional freeness tests are not satisfactory.

The test requirements are that (1) a constant pressure be used throughout the test, (2) the timed volume be small with respect to the total volume, and (3) a low consistency be used. The equipment needed for this test consists of (1) a supply of air-free constant-temperature water, (2) a constant pressure filtration unit including a pad forming area, and (3) a receiver in which to collect and measure the water flowing through the pad.

▶ For penetrating wood chips with cooking liquor, J. E. Stone of the Institute of Paper Chemistry reported that centrifuging chips submerged in cooking liquor is very effective, both for air-filled and water-saturated chips. The principle involved is the production of a unique directional driving force through the wood, the less dense fluid components—air or water—tending to move toward the axis of rotation, while the more dense component —cooking liquor—tends to move in the opposite direction.

▶ New developments in cleaning recovery boilers were reported by Paul West of Thilmany Pulp & Paper Co. The problem in a recovery furnace is that the average particle size of the soot is too small (2 microns) to carry sufficient impact momentum to have much self-cleaning value. A shot-cleaning system for cleaning the air heater and economizer of the Babcock & Wilcox recovery furnace, in nine-months' operation, has proved surprisingly efficient and superior to any other cleaning system. The steam saved by eliminating the soot-blowing system, it is claimed, offsets the high initial cost of the installation of the shot-cleaning system. There still remain problems of excessive wear and of dust separation from the shot. Once these are overcome, the shot-cleaning system will be extended to other parts of the furnace.

*Reported at the Ninth Annual Tappi Alkaline Pulping Conference, Chattanooga, Tenn.

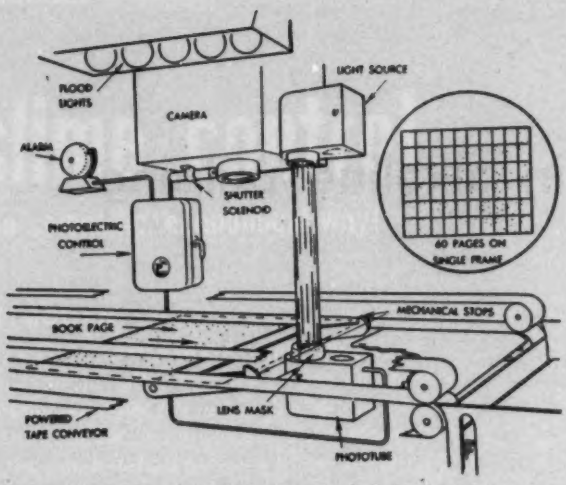

Fig. 1—Photoelectronic control of alignment

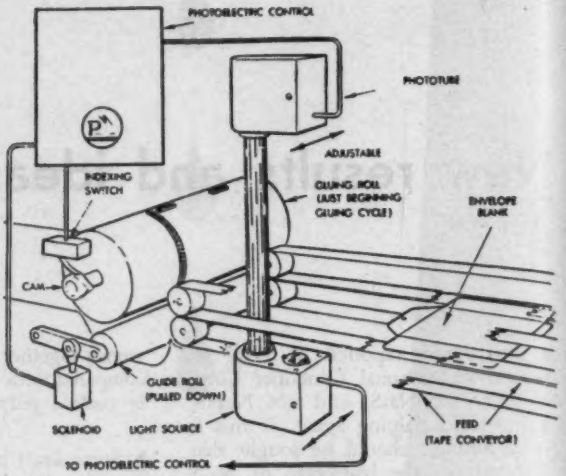

Fig. 2—Photo-cell controls envelope machine

Use of electronic photoswitches in the paper industry

LEO WALTER

THERE ARE MANY WAYS in which efficient operation can be achieved in the paper industry by the use of electronic photoswitches. A few examples, showing how various problems have been solved in practice, should be of general interest to the papermaker and converter. As materials handling, particularly with reference to conveyor systems, is one of the most important fields of application of photoelectronic controls in industry, a few case histories have been selected to show how savings in production cost and improvements in production control can be expected from use of photo-electronic gadgets. In many instances, for example, carton handling operations can be designed so that practically no manual labor is required from the time that containers are placed in cartons or boxes until they are delivered to transport trucks on the shipping platform.

Photoelectric tubes and cells

The "photoelectric effect" is the name given to the power shown by light rays of causing a body to emit electrons. When light falls on certain substances, electrons are released — sometimes at very high velocities. The general structure of a photoelectric cell consists of a curved copper or silver plate coated with a photosensitive material, such as caesium or potassium, which serves as the cathode of the cell. A wire electrode is the anode, and both electrodes are sealed in an evacuated glass bulb. The originally limited sensitivity of a phototube was overcome to some extent by introducing a small quantity of inert gas. These cells are called "photoemissive".

Another effect, the "photo-conductive" effect, produces a change in the electrical resistance of crystalline selenium with illumination. Selenium cells are very useful when an on-and-off function is required. The current through selenium cells usually does not exceed a few milli-amperes, but electronic relays can be used for amplification.

Application of photo-tubes in practice ranges from simple counting to limiting and to elaborate sorting and changing of mechanical movements. The basic equipment is generally a light source producing a beam of light, and a gadget containing the photocell. Electronic timers and relays are added when required.

Register control

As early as 1937, electronic equipment was used in the printing industry for registering colors automatically. Photoelectric register control holds the printed matter in proper relation with the processing despite paper shrinking, stretching, and slippage in the draw rolls. The photoelectric tube detects the position of the printing and the minute photoelectric effect is amplified to a value to operate devices which apply corrective action. If in multi-color printing the register differs more than a few thousandths of an inch, the datum line printed along the edge of the sheet in the first color produces signal impulses from two photo-tubes. They are fed to a mixing panel which determines whether the second impression will register correctly.

Loop control

Where it is required to maintain automatically a certain loop in a fast-

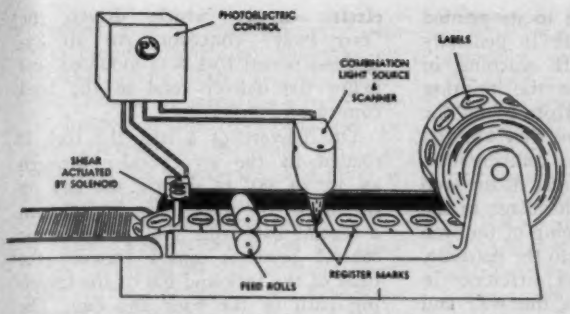

Fig. 3—Cutting of labels and wrappers controlled by photo-cell

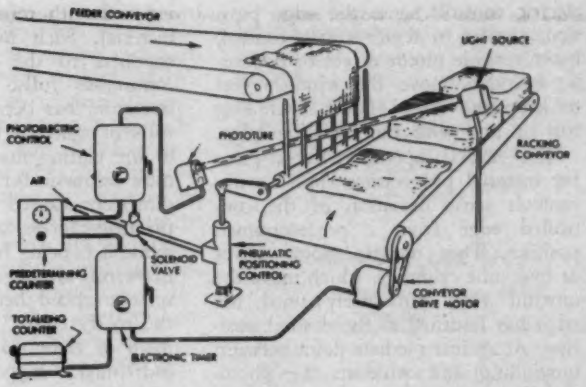

Fig. 4—(Right) Automatic bag stacking to predetermined count

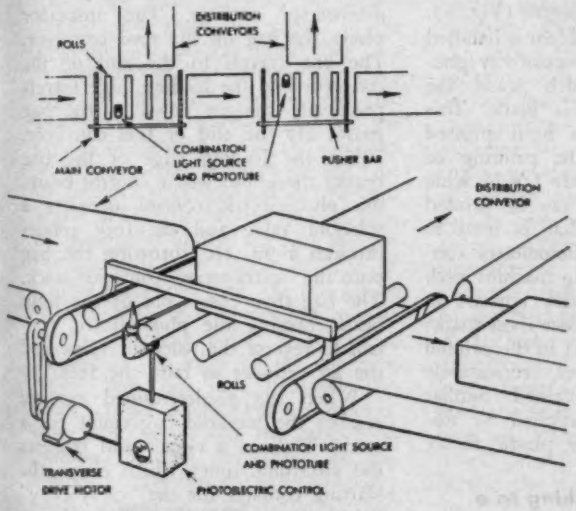

Fig. 5—Photoelectric automatic sorting of cartons

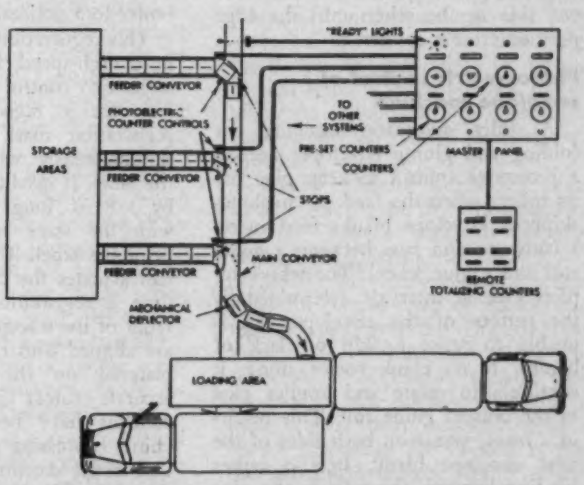

Fig. 6—Automatic conveyor distribution system for boxes and containers uses master panel and photoelectric gadgets

moving web of paper, the following photoelectric control system will provide correct loop position. A series of vertical light beams is directed against the loop opposite a correlated series of photo-tubes. When the loop cuts off half of the light, the system is in equilibrum. If the loop moves from the desired position (either higher or lower), the motor speed is automatically varied to restore the desired loop position. An electronic amplifier and (photoelectric) thyratron panel produces the required speed change on the pinch roller.

An actual case history deals with automatic alignment for photographic reproduction, using a photoelectric controller and an electronic timer.

A printing establishment photographs complete books, page by page, with an automatic high-speed camera. The book pages feed under the camera on a tape conveyor and are stopped in photographing position by light mechanical arms. The camera takes a picture of the page, after which the conveyor moves the photographed page away. A new page comes into position, and the operation is repeated.

Often a page is incorrectly aligned as it moves into position. The resulting skewed photographs are not detected until the film is reviewed, and then the spoiled negatives—each of which contains pictures of 60 pages—must be completely rephotographed. A simple reliable means of precise, accurate alignment was required to ensure a correctly aligned photograph of each page. Attempts to use mechanical feeler switches were unsuccessful because such switches either wrinkled the page or would not respond to the light weight of the paper (Fig. 1).

A simple solution to this problem was provided by a photoelectric control placed underneath the conveyor so that only a correctly aligned page would block the control beam at the moment when the page was in position to be photographed. Precise alignment was ensured by restricting the photo-tube opening to a very small dimension by means of an optical slit. Consequently, only when the page is in proper alignment, as indicated by the photoelectric control, is the electric circuit of the camera shutter solenoid completed. A page coming into position at a skewed horizontal angle does not completely block the photoelectric control beam. Under this condition the photoelectric control is inoperative and prevents operation of the shutter solenoid. Simultaneously an alarm sounds, which rings until the condition is corrected by manual realignment of the page.

Photoelectric edge position control is also widely used in other different forms to automatically position moving webs of paper, plastics, foils, and metals. The two edges of these stiffer materials are always the same distance apart, so it is necessary to monitor the movement of only one edge. In "web follow-up" the material is wound up on a roll. The photo-

electric controls sense the edge position, similar to tenter frame control, but reversible motor drives or hydraulic cylinders move the wind-up reel to keep the edge of the wound-up roll in line with the traveling edge.

The reverse operation takes place for material progressing from an uncontrols sense deviation of the controlled edge from a predetermined position. They operate motor drives or hydraulic cylinders, which move the unwind reel transversely until the edge has returned to the desired position. At an intermediate point between unwinding and wind-up the photoelectric controls operate pivoted steering rolls which guide the material to one side or the other until the edge position error is corrected.

Photoelectric control of envelope machine

A fully automatic machine for folding and gluing envelopes needed a protective control to keep glue off its rollers when the feed of envelopes skipped. Envelope blanks feed in on a conveyor and pass between a guide roll and a glue wheel. The wheel applies glue at intervals determined by the pattern of the envelope, but is unable to sense a skip or lack of blanks. If no blank comes along, it continues to rotate and applies glue to the bottom guide roll. This results in a messy smear on both sides of the next envelope blank. It also causes binding between the rolls as the glue builds up.

The problem was solved by high-speed photoelectric controls that detect the presence or absence of envelope blanks.

Under normal operating conditions, each paper blank breaks the photoelectric beam at the exact instant a cam, geared to the glue wheel shaft, closes a synchronizing switch. If the control beam is not broken by a blank at the instant the switch closes, the switch operates a solenoid which retracts the guide roll from the glue wheel. After the glue applicators have passed the guide roll, the cam switch drops the solenoid. This provides for normal engagement of the glue wheel and guide roll for the next envelope blank. Small size photoelectric controls were used because of the limited space available and because their position must be adjusted frequently to provide for processing a wide range of envelope sizes (Fig. 2).

Photoelectrically controlled cutting of labels and wrappers

When labels and wrappers are being cut to size, it is essential that the edge of each wrapper be properly indexed with reference to its printed material. Such material is generally supplied to the cutoff machine in continuous rolls. Since the printing operation has been performed on the rolls of material before they are fed to the cutting machine, compensation must be made for changes in the web dimension caused by shrinkage in the printing process, stretching of the web while it is being fed into the machine, draw roll slippage, and difference in relative speed between the web and the rotary cutter. Although the increment of error may be small for each individual wrapper, it is cumulative and, if not corrected, will result in the trade-mark becoming quickly off-center to a noticeable degree (Fig. 3).

This registration problem is handled by a high-speed, high-sensitivity photoelectric control which scans the web for a registration mark. This registration mark has been printed simultaneously with the printing of the label. It need be only 1/8 in. wide by 3/8 in. long and can be printed with the same ink that is used to print the label. The photoelectric control actuates the cutting machine each time a registration mark appears in front of the scanner. Since these marks are aligned with respect to the printed material on the label, consistently accurate cutoff is obtained. Similar controls have been applied to machines processing paper, plastic, metal, and textile sheeting.

Automatic bag stacking to a predetermined count

After bags are manufactured, they are arranged for bundling in piles of a predetermined number. Previously, the counting equipment was actuated by a lever arm triggered by the passing bag. This lever arm operated a ratchet wheel which counted the bags by the number of teeth in its periphery. When the wheel had made a complete revolution, it tripped another arm which actuated a one-revolution clutch. When the clutch engaged, it moved the conveyor with the counted stack of bags a predetermined distance, thus making room for another stack.

The lever arm sometimes fouled the bag, as some force was required to operate the ratchet. The associated mechanical linkages required extensive maintenance. Irregularities in the count required extra operator labor to recount bags.

The bag-operated lever arm was replaced by a photoelectric control. The ratchet wheel was replaced with an electric predetermined counter. The one-revolution clutch and associated linkage were discarded and replaced by an electronic timer operating an electric motor which drives the "carry-away" conveyor. An air cylinder-actuated fork was mounted just below the delivery end of the feed conveyor (Fig. 4).

On delivery of a bag, the fork is rotated by the air cylinder through an arc of 90° to deposit the bag on the top of the stack being built up on a second conveyor. The photoelectric control beam is aimed between the tines of the fork and out of the traveling path of the fork and bag. The photoelectric control beam is located so that it will be interrupted by the overhang of a bag as it leaves the feed conveyor. It operates both the air cylinder-actuated fork and the predetermined counter. The inspector places the bag on the feed conveyor. The bag travels to the end of the conveyor and the leading edge travels practically straight down as the bag passes off the end of this conveyor. When the leading edge of the bag breaks the photoelectric control beam, the photoelectric control operates a solenoid valve and the fork rotates through a 90° arc, throwing the bag onto the "carry-away" conveyor stack. The bag then passes out of the light beam, causing the photoelectric control to reverse the solenoid valve and the air cylinder to raise the fork.

When the predetermined counter reaches the required bag count for a stack, it closes a circuit and triggers the electronic timer which closes the starting contacts for the "carry-away" drive motor. The timer contacts remain closed for a pre-set interval, and the "carry-away" conveyor moves a fixed distance and stops. This moves the stack of bags out of the stacking position before the next bag is delivered by the stacker, thus clearing the space for building a new pile. An additional feature is an electric totalizing counter which computes the output of bundles directly.

Considerable benefit resulted from the increased production, the elimination of the necessity for re-counting and manual packing, as well as the elimination of the cost of maintaining the troublesome mechanical linkage.

Photoelectric sorting of cartons

In a manufacturing plant, a main conveyor carries cartons of three types from the manufacturing area to the warehouse. Once in the warehouse, each type of product must be sorted and sent to its own storage area. Since the cartons containing any one type of product differ widely in all dimensions, it is not feasible to sort by size and shape. Before an automatic sorting system was devised, two men were in constant attendance to push

cartons from the main conveyor onto the proper distribution conveyors.

Two photoelectric controls solved the problem of automatic sorting. One is located at the right-hand side of the conveyor at the first discharge point in the warehouse. The other is at the left-hand side of the conveyor at the second discharge point.

The actuating device for the scanners is a small strip of reflecting tape put on by the packer when he assembles a carton. For one type of product this strip is located along one edge of the carton bottom and extends almost to the middle of the carton. For the second type the strip is located along the same edge of the carton bottom, but from the middle to the opposite side of the carton. No tape is used for cartons carrying the third type of product. The cartons are placed on the conveyors so that the tape is at right angles to the direction of carton travel. The tape on one type of product is at one side of the conveyor. The tape on the second type of product is at the opposite side of the conveyor.

The scanners "look" at the carton bottoms between the conveyor rolls at each discharging point. One scanner located at one edge of the conveyor "sees" only one tape location. The other scanner is located at the opposite edge and "sees" only the other tape location. Making observation at the bottom of the cartons ensures correct focus because all tapes are at a fixed distance from the scanners (Fig. 5).

Upon "seeing" a reflecting tape pass, the photoelectric control operates a pusher bar mechanism, which removes the carton from the main conveyor onto the proper distribution conveyor. Cartons without a reflecting tape pass right by the first two distribution conveyors to the third storage area. This new sorting system has resulted in increased efficiency, sorting speed, and accuracy in warehousing of various types of product. At the same time, warehouse labor cost has been greatly reduced.

Automatic conveyor distribution system

A large modern factory handling thousands of cases daily had the problem of filling orders accurately and moving them swiftly from storage areas to waiting trucks and trailers. Loading docks were limited, and serious traffic congestion resulted unless trucks were loaded quickly. Eight different sizes and types of containers had to be carried and routed correctly. The nature of the operation from storage to the shipping dock called for centralized control.

What was needed was a reliable automatic device to count and sort the cases making up a single order. Counters actuated by mechanical limit switches are not accurate enough. Variations in the size of cases and their positions on the conveyor—as well as dents, holes and torn spots in the cartons—all interfere with mechanical limit switch operation and contribute to inaccurate counting. In addition, the high impact of fast-moving cases makes mechanical switches bounce. This results in false counts and rapid switch failure due to excessive wear.

Photoelectrically-controlled predetermined counters solved the counting problem. Only photoelectric controls can accurately count cases of all descriptions, shapes and weights. Here is how the new system works: Main conveyors run from the storage to the shipping area. At the storage end, the main conveyors are fed by a number of feeder conveyors, each of which carries cases of a specific type. Each feeder conveyor is equipped with photoelectric control at the junction with the main conveyor. When a case passes through the beam the photoelectric relay operates two electromagnetic counters. One is a simple totalizing counter and the other a predetermined counter. The counters for all lines are grouped at a master control panel, permitting one operator to supervise the count for any line (Fig. 6).

Upon receiving an order, the operator sets the dial of one predetermining counter for the number of cases of a given type. By remote control, he opens a deflector to route the cases from the feeder to the main conveyor. He then pushes a "start" button to operate the selected feeder conveyor. When the required number of cases passes the light beam on the feeder conveyor, the predetermining counter stops the conveyor and lights a control panel lamp, indicating that this part of the order has been completed. This process is repeated for each type of case ordered by selecting proper feeder conveyors and counters. It is claimed that this efficient control system has not only increased the speed, efficiency and accuracy of filling orders but has resulted also in considerable reduction of labor costs.

The above case histories, published with assistance from the Photoswitch Div. of Electronic Corp. of America, give only a very small selection of problems solved with photocell use. Only a few decades ago there was no such device, but since the discovery of the electron tube, some 40 years ago, the subject of electronics in general has become familiar to a younger generation of technicians. The electronic valve has become a tool for the engineer and production man in the paper industry that has helped in achieving better efficiency in many ways.

Technology and Trade

(Continued from page 843)

ship between the United States and Canada.

We are both peaceful nations; it is inconceivable that we would not be on the same side of an international dispute. Living standards and wage rates are so nearly alike that differences can be ignored. Our governmental systems are stable and responsible. As individuals, we observe the same codes of ethics, morality, and practice.

Would it not be worthwhile, then, to look toward the day when all trade barriers between our two countries could be eliminated?

Canada has many inherent advantages for certain types of manufacturing industry, and the United States markets are within easy reach. The converse is, of course, equally true. In either case, north-south trade is more logical than east-west. And a special advantage for Canada is that the expanded market would relieve Canadian enterprises of the handicaps arising out of uneconomically small units.

Could such a thing be accomplished without political union? I think it could and should. Within the framework of freedom, competition in governments is perhaps as essential as competition in industry. It is a good thing for Washington to look at Ottawa and Ottawa at Washington to see and recognize at their honest worth such political experiments as each side may attempt.

As to our more personal relationships, we think alike, act alike, dress alike, and look alike. We take on each other's citizenship without sense of loss or particular change. The resident of Boston has a closer bond with the resident of Toronto than he does with the resident of New Orleans or Los Angeles. The Nebraska farmer would be more at home with the Manitoba farmer than with his own counterpart in South Carolina or New Jersey.

Free trade between Canada and the United States should be a goal, a challenge, an adventure in international amity. If free trade could exist anywhere on earth, it should succeed here.

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NEWS of the INDUSTRY

NEW WOOD PREPARATION plant of Consolidated Water Power & Paper Co. that is now in operation. Workmen in center foreground guide logs from the hot pond to jackladders of the 205- by 126-ft. structure. Emerging from the building at the left is the groundwood belt conveyor, while in the left background an 8-ft. conveyor tube carries chips to sulfite and semichemical plants

BARKED PULPWOOD LOGS move along 160-ft. sorting belt at the new Wisconsin Rapids Div. plant. Operator standing in front of the central control panel (r) regulates process rates. Shown are four of the five take-off stations. To the left of the control panel are the splitter and caul take-offs, while at the left workmen guide wood from the groundwood take-off

Consolidated WP&P Puts $1,500,000 Wood Preparation Plant in Operation

CONSOLIDATED WATER Power & Paper Co. has begun operation of its new $1,500,000 wood preparation plant at the Wisconsin Rapids (Wis.) Div. Incorporating the latest technological improvements, the unit is one of the most modern in the industry.

Between 400 and 500 cords of pulpwood are being processed in each 16-hour daily operation.

Designed jointly by Consolidated and Link-Belt Co., the 205- by 126-ft. plant is constructed of steel and aluminum. L. W. Murtfeldt, pulp superintendent, stated recently, "We have found in our first weeks of operation that it is fully meeting our expectations."

Heart of the operation is a ½-mile conveyor system that moves the wood with dispatch through the various processing stations. Logs are completely barked, sorted and cut into chips within 23 minutes.

110° Throughout the Year

The wood processing begins when cranes place logs ranging in length from 8 to 18 ft. into a hot pond for soaking to remove dirt and soften the bark. The pond, warmed to 110°F. by extraction heat from spent sulfite liquor, is the first known large-scale heating method of its type. It enables the firm to bark wood at about an equal rate throughout the year. Water in the pond is circulated by pumps, moving logs to the jackladders and thereby minimizing pike pole handling.

Jackladders move logs from the pond at speeds of from 10 to 90 fpm. Hydraulically-controlled saws on the ladders saw into 4-ft. lengths for splitting all logs that are more than 2 ft. in diameter.

From the jackladders the wood is conveyed to two revolving barking drums, each of which is 12 ft. in diameter and 45 ft. long. At the end of the drum barkers are located the industry's first remotely-controlled air-operated gates regulating the discharge of wood onto a 160-ft. sorting belt 60 in. in width. The belt has five take-off stations. Process rates along the belt are controlled by an operator at a central panel. He is assisted by workmen at each station.

The first take-off provides for return of logs to drum barkers for further barking when necessary.

Major Suppliers and Equipment at Consolidated W P & P

Air compressor and pumps	Ingersoll-Rand Co.
Aluminum siding (Reynolds) and structural steel	Wisconsin Bridge & Iron Co.
Barking drums (12' x 45') and bark presses	Fibre Making Processes Inc.
Bark silo	A. O. Smith Co.
Chipper (110-in.)	Carthage Machine Co.
Conveyor, chip screen, miscellaneous equipment and general process engineering	Link-Belt Co.
Conveyor belting	Manhattan Rubber Co. U. S. Rubber Co.
Fire protection	Grinnell Co.
Heat exchanger	DeLaval Separator Co.
Heating and ventilating equipment	Swartwout Co. and Trane Co.
Jackladder, gang saws, hydraulic splitter and rechipper	D. J. Murray Mfg. Co.
Motors, controls and lighting	General Electric Co.
Pumps	Crane Engineering Co.

NEWS of the INDUSTRY

NEW WOOD PREPARATION plant of Consolidated Water Power & Paper Co. that is now in operation. Workmen in center foreground guide logs from the hot pond to jackladders of the 205- by 126-ft. structure. Emerging from the building at the left is the groundwood belt conveyor, while in the left background an 8-ft. conveyor tube carries chips to sulfite and semichemical plants

BARKED PULPWOOD LOGS move along 160-ft. sorting belt at the new Wisconsin Rapids Div. plant. Operator standing in front of the central control panel (r) regulates process rates. Shown are four of the five take-off stations. To the left of the control panel are the splitter and caul take-offs, while at the left workmen guide wood from the groundwood take-off

Consolidated WP&P Puts $1,500,000 Wood Preparation Plant in Operation

CONSOLIDATED WATER Power & Paper Co. has begun operation of its new $1,500,000 wood preparation plant at the Wisconsin Rapids (Wis.) Div. Incorporating the latest technological improvements, the unit is one of the most modern in the industry.

Between 400 and 500 cords of pulpwood are being processed in each 16-hour daily operation.

Designed jointly by Consolidated and Link-Belt Co., the 205- by 126-ft. plant is constructed of steel and aluminum. L. W. Murtfeldt, pulp superintendent, stated recently, "We have found in our first weeks of operation that it is fully meeting our expectations."

Heart of the operation is a ½-mile conveyor system that moves the wood with dispatch through the various processing stations. Logs are completely barked, sorted and cut into chips within 23 minutes.

110° Throughout the Year

The wood processing begins when cranes place logs ranging in length from 8 to 18 ft. into a hot pond for soaking to remove dirt and soften the bark. The pond, warmed to 110°F. by extraction heat from spent sulfite liquor, is the first known large-scale heating method of its type. It enables the firm to bark wood at about an equal rate throughout the year. Water in the pond is circulated by pumps, moving logs to the jackladders and thereby minimizing pike pole handling.

Jackladders move logs from the pond at speeds of from 10 to 90 fpm. Hydraulically-controlled saws on the ladders saw into 4-ft. lengths for splitting all logs that are more than 2 ft. in diameter.

From the jackladders the wood is conveyed to two revolving barking drums, each of which is 12 ft. in diameter and 45 ft. long. At the end of the drum barkers are located the industry's first remotely-controlled air-operated gates regulating the discharge of wood onto a 160-ft. sorting belt 60 in. in width. The belt has five take-off stations. Process rates along the belt are controlled by an operator at a central panel. He is assisted by workmen at each station.

The first take-off provides for return of logs to drum barkers for further barking when necessary.

Major Suppliers and Equipment at Consolidated W P & P

Air compressor and pumps	Ingersoll-Rand Co.
Aluminum siding (Reynolds) and structural steel	Wisconsin Bridge & Iron Co.
Barking drums (12' x 45') and bark presses	Fibre Making Processes Inc.
Bark silo	A. O. Smith Co.
Chipper (110-in.)	Carthage Machine Co.
Conveyor, chip screen, miscellaneous equipment and general process engineering	Link-Belt Co.
Conveyor belting	Manhattan Rubber Co. U. S. Rubber Co.
Fire protection	Grinnell Co.
Heat exchanger	DeLaval Separator Co.
Heating and ventilating equipment	Swartwout Co. and Trane Co.
Jackladder, gang saws, hydraulic splitter and rechipper	D. J. Murray Mfg. Co.
Motors, controls and lighting	General Electric Co.
Pumps	Crane Engineering Co.

THE 8400-TON "Sarah Bowater" arrives at Corner Brook, Nflnd., on her maiden voyage. She is a newsprint carrier designed for trade with ports on the east coast of the United States

Bowater's Places New Ship in Coastal Trade

The 8400-ton newsprint carrier *Sarah Bowater* has entered Bowater Steamship Co. Ltd. service between Corner Brook, Nflnd., and New York. (Bowater Steamship is a subsidiary of Bowater's Newfoundland Pulp & Paper Mills Ltd.)

The main service of the new ship and her sister ship, the *Margaret Bowater,* is on the run between Corner Brook and eastern United States ports. However, occasional newsprint shipments are also carried to the United Kingdom.

Designed primarily for carrying newsprint, the vessels are virtually identical. They can each carry 4800 tons of newsprint under deck, with an additional quantity as a deck cargo. The dimensions are: Length, 395 ft.; beam, 58 ft. 6 in., and depth, 35 ft. 6 in. Both ships are strengthened for ice navigation. The speed of the *Sarah* is 15 knots, and she is powered by steam turbines.

The ships have no 'tween or shelter decks and are equipped with large hatches with the McGregor folding hatch covers. Special attention has been paid to accommodations, which for both crew and passengers are "of very high order."

On her maiden voyage from the vast Bowater's mills at Corner Brook, the *Sarah* called at New York, Philadelphia, Norfolk, Va., and Miami. She was built in Dumbarton, Scotland, by William Denny & Bros. Ltd. A third and larger vessel is under construction.

The second take-off moves the logs to saws that cut them into 2-ft. bolts for groundwood. The bolts are conveyed 150 ft. to the old hot pond, which has been converted into a groundwood bolt tank. From there the wood is automatically moved by conveyor 800 ft. for processing into groundwood pulp.

One Stroke of a Piston

A third take-off handles large-diameter logs. A splitter quarters them with one stroke in a matter of seconds. Another take-off handles cull wood, while the fifth is a conveyor belt to a chipper designed for special use.

At the end of the sorting belt is a 110-in. Carthage-Norman chipper, which in 3 seconds cuts 8-ft. logs into thousands of ¾-in. chips. This 1000-hp chipper makes 360 rpm, chipping the wood with twelve 30-in. knives. (The knives are changed and sharpened after every 8-hour shift.)

From the chipper the chips are moved via a belt to a vertical elevator that hoists them to the top of five-story chip bins in the wood preparation plant. They are moved mechanically from these bins, screened and conveyed to the sulfite or semichemical plant on a 390-ft. conveyor.

Removed bark is utilized as industrial fuel. During one day's operation the equivalent of 50 tons of coal is collected, put through a press that squeezes out up to 40 per cent moisture content, is chopped and blown into a storage silo for eventual burning in plant boilers.

The plant operates 16 hours a day and is manned by 17 men during each 8-hour shift. The old woodroom building that has been replaced is being cleared of equipment and converted to a paint and pattern shop.

The wood preparation facility handles spruce, balsam, hemlock, poplar, birch and mixed hardwoods.

Ebasco to Build New Rayonier Mill

Ebasco Services Inc. has been named builder of the new $25,000,000 chemical cellulose mill at Jesup, Ga., for Rayonier Inc. The announcement was made by Russell F. Erickson, Rayonier vice president in charge of engineering and manufacturing.

Ebasco will handle engineering and construction management services similar to those it provided for Rayonier's initial plant at Jesup. The latter was placed in operation in 1954 for the production of advanced types of chemical cellulose primarily for the tire cord and rayon industries.

The new mill will have an annual rated capacity of 100,000 tons of chemical cellulose, bringing total Jesup capacity to more than 200,000 tons.

Scott May Build in Nova Scotia

W. T. Dauphinee, trade and industry minister for Nova Scotia, has revealed that Scott Paper Co. may build a $35,000,000 chemical pulp mill in the Canso Strait area.

According to Mr. Dauphinee, the Chester, Pa. firm is studying the economic feasibility of establishing a bleached kraft mill in eastern Nova Scotia. The survey was expected to require six months.

Scott Buys Interest in BCFP

Scott recently revealed plans to purchase 1,000,000 common shares to be issued by British Columbia Forest Products Ltd. at $15 per share. Payments will extend over a two-year period, and when completed Scott will hold about 29 per cent of the Vancouver, B. C. wood products firm.

H. G. Munro, president of British

Columbia Forest Products, declared that the American investment would provide a portion of the capital required for construction of a new bleached kraft pulp mill on Vancouver Island. The proposed mill will use as raw material the wood waste from the firm's sawmill and plywood mill, a veneer plant and a shingles mill.

Marathon Purchases Canadian Box Firm

The purchase of Manchester Paper Boxes Ltd. of Toronto has been announced by Marathon Corp. at Menasha, Wis. Manchester produces folding and set-up paperboard boxes.

According to John Stevens Jr., president of Marathon, "Acquisition of Manchester's converting and sales facilities will enable Marathon to distribute its product line of packages and packaging materials in the rapidly expanding Canadian market."

The Canadian firm will function as a division of Marathon, with Donald Manchester as general manager and Alan Manchester, founder of the firm who is retiring as president, retaining an active interest in operations.

Rocky River Paper Bought by Detroit Industrialist

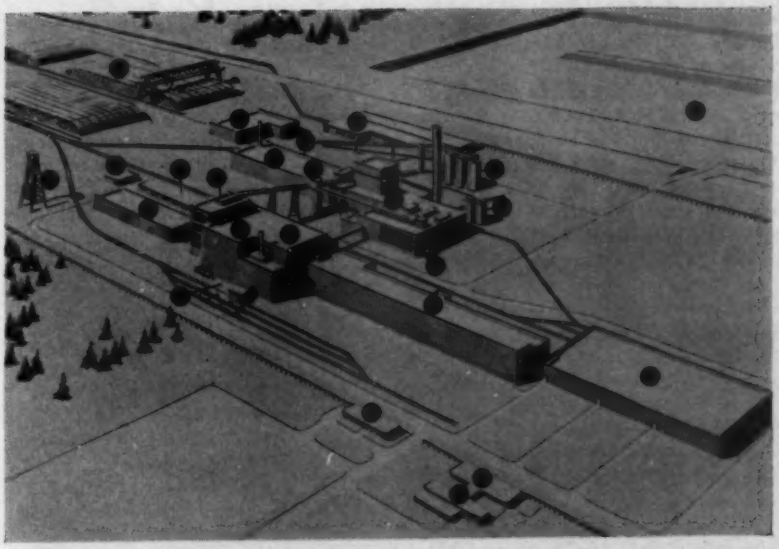
Paul H. Travis of Detroit has recently purchased a majority of the outstanding capital stock of Rocky River Paper Mills Inc. of Three Rivers, Mich. The firm produces various grades of paperboard.

Mr. Travis, a widely known Detroit industrialist, owns Rochester Paper Co. of Rochester, Mich.

New officers announced following the purchase are: President, John C. Plantefaber, who has held the post since the firm was organized in 1947; vice president, Mr. Travis; secretary, Nathan B. Goodnow, a member of the Detroit law firm of Dykema, Jones & Wheat, and treasurer, Frank R. Warner Jr. Robert Massengale will continue as general superintendent.

The new management intends prompt installation of additional production facilities designed to increase the mill's output and at the same time improve its quality. A new stock preparation system is planned, and a complete quality control laboratory is soon to be in service.

Eventually the annual capacity will be 18,000 tons of set-up and folding boxboards, paperboard for food packaging, chocolate layer board, paper plate board, ticket bristol, and other board specialties.



PERSPECTIVE DRAWING for new Hinton, Alta. mill of North Western Pulp & Power Ltd. Various features of the 150,000-ton plant are: (1) Wood storage, (2) wood room, (3) filter, (4) lime kiln, (5) recausticizing, (6) water treatment and filter plant, (7) chip silos, (8) salt cake storage, (9) recovery, (10) power generator, (11) warehouse, (12) machine room, (13) brown stock washing and screening, (14) bleaching, (15) digesting, (16) raw materials warehouse, (17) repair shop and stores, (18) truck garage, (19) elevated fire tank, (20) chemical unloading, (21) clinic and time office, (22) main office, (23) woodlands office, and (24) effluent retention pond

Alberta Mill Project Ahead of Schedule

Construction work on the huge North Western Pulp & Power Ltd. pulp and paper mill at Hinton, Alta., is well ahead of schedule. (North Western is a joint venture of St. Regis Paper Co. and North Canadian Oils Ltd.)

The original target date — the spring of 1957 — may be advanced by some months if the present work schedule is maintained. The $33,000,000 mill producing bleached kraft pulp will have a daily capacity of 430 tons. Principal markets are expected to be in the United States.

Two large digesters each with a daily capacity of 250 tons and based on a Swedish design are being installed. A continuous cooking process will be used. President Frank Ruben of North Canadian Oils pointed out that conventional pulping techniques would have involved several smaller digesters.

Cement for the chip silos has been poured for their complete 94-ft. height, and construction engineers plan to pour cement for the pulp mill during the forthcoming winter months.

Foundations have been started for a power house that will contain two steam boilers with a capacity of 175,000 lbs. per hr. One unit will be fired by natural gas and the other by natural gas and wood bark.

Another of the work projects is the water settling basin, which is 1800 ft. in length and approximately 300 ft. wide with a depth of 12 ft. Work is also proceeding on a water filtration basin. The mill will use approximately 25,000,000 gal. of water daily.

Using lodgepole pine and white spruce, the mill will have the world's largest installation of the new Kamyr continuous cooking process and the first such installation in North America. The process makes it possible to control closely the variables in cooking and thus insure more uniform pulp.

In order to provide the whitest and brightest possible bleached pulp, two-stage chlorine dioxide bleaching will be provided in the six-stage bleach plant.

The 450-ton Dominion-Minton drying machine will be totally enclosed and comprise 66 dryers, which according to St. Regis is probably the greatest number ever built into one unit. The dry end of the machine will be equipped with automatic baling and weighing machinery to pack the sheets of pulp into 400-lb. bales.

Pulp Output Up 14%

The nation's production of wood pulp is rolling toward a new record with a 14-per cent gain in the first nine months of 1955.

The achievement was reported recently by Lawson P. Turcotte,

president of Puget Sound Pulp & Timber Co., in his latest periodic review of the industry.

Domestic output of all classes of pulp totaled 15,445,000 tons for the nine-month period. This was 1,920,000 tons more than was produced in the same period of 1954. For all of 1954 pulp production amounted to 18,000,000 tons.

The domestic industry, Mr. Turcotte noted, is "moving forward at a rate seldom before witnessed. Production and consumption constitute almost a doubling of volume within the post-war decade."

Mr. Turcotte noted that imports and exports of pulp also are rising, with the latter's growth now making this country a world supplier of importance.

Domestic use of wood pulp for conversion into finished products and for inventory total 16,641,000 tons in the first nine months of 1955. This was a gain of 13 per cent over the 1954 period.

MacMillan & Bloedel Adds $18 Million to Expansion

An additional $18,000,000-expansion at Port Alberni, B. C., has been announced by MacMillan & Bloedel Ltd. This will double the capacity of the $40,000,000 addition for which construction began in July.

Completion of the expansion project will bring daily newsprint production at Port Alberni to about 600 tons.

The $40,000,000 unit will be rolling in the first half of 1957, while the $18,000,000 addition will get underway sometime in 1958.

Included in the recently-announced expansion will be an additional grinder and screen room and a high-speed neswprint machine having a speed of 2500 fpm.

According to B. M. Hoffmeister, president of MacMillan & Bloedel, "Expansion of newsprint production at Port Alberni will be another step in the direction of making the best use of tree species in the Alberni region forests."

U. of Florida Schedules Electrical Engineering Conference for March 8-9

The American Institute of Electrical Engineers' Conference on electrical engineering as applied to the paper and pulp industry has been scheduled for March 8 and 9 at the University of Florida in Gainesville.

The conference will be jointly sponsored by the AIEE subcommittee on paper and pulp, the Jacksonville Section of AIEE and the College of Engineering at the University of Florida.

Among the subjects to be discussed are: the use of atomic energy in industrial plants, the use of television in the paper and pulp industry, problems in adaptation of electrical engineering to the paper industry and conduit problems and their solutions in paper mills.

Sutherland-Ft. Orange Merger Completed

Sutherland Paper Co. of Kalamazoo, Mich., has acquired Fort Orange Paper Co. of Castleton-on-Hudson, N. Y. The New York firm will be operated as a wholly-owned subsidiary with its present management and personnel.

Officers of Fort Orange are: R. S. Harris (formerly president), chairman of the board; William Race, president; Gaylord Beason, executive vice president and general manager; R. P. Jones, vice president and assistant secretary; L. W. Peter, vice president; E. W. Smith, secretary; J. E. Paul, controller, and C. I. Coleman, treasurer.

Finch, Pruyn Plans Paper Storage and Finishing Unit

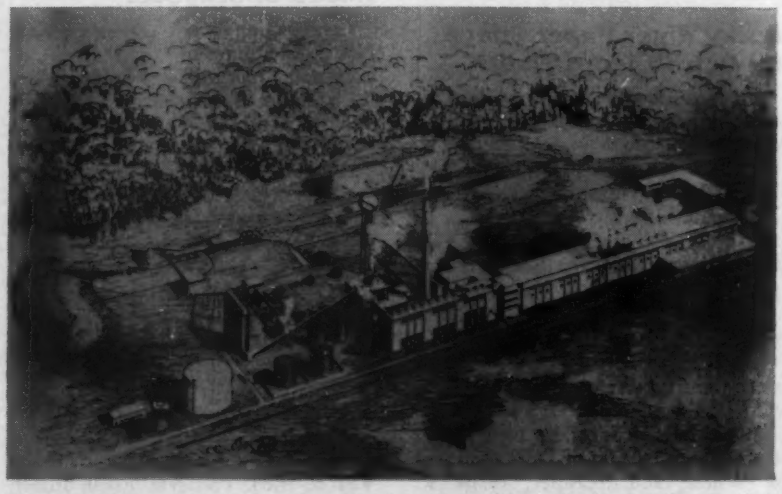
Finch, Pruyn & Co. Inc. of Glens Falls, N. Y., has announced that its new paper storage and finishing building will be ready for occupancy March 1. The structure will provide the firm with an additional 40,000 sq. ft.

Approximately 7000 sq. ft. will be devoted to trimming, ream sealing and packaging operations. A new Clark-Aiken rotary cutter will be installed. A Brackett safety trimmer and Hayssen ream sealer will help handle the increased volume of cut-size paper.

Consolidated WP&P Plans Installation of New Machine at Biron Div.

A multimillion dollar expansion program has been anounced by Consolidated Water Power & Paper Co. at Wisconsin Rapids, Wis.

A new paper machine designed for the production of magazine paper is on order from Beloit Iron Works. It is expected to be in operation by June 1, 1957. The unit will be located at the Biron Div.



PRELIMINARY SKETCH of Container Corp.'s proposed bleached pulp and board mill in Brewton, Ala.

Container Corp. to Build $30 Million Mill in Ala.; Will Expand on W. Coast

Container Corp. of America will build a $30,000,000 bleached sulfate pulp and board mill at Brewton, Ala. The mill will be the first of its kind owned by the firm.

According to Leo H. Schoenhofen, the plant will meet a large portion of the requirements for bleached pulp board created by the company's greatly increased production of food cartons. Further, the mill will help supply bleached pulp to Container's northern boxboard mills. Mr. Schoenhofen is senior vice president of the firm.

(Several weeks ago officials of Container Corp. were considering locating the mill near South Boston, Va. The site was abandoned for economic reasons.)

A 5000-acre tract has been purchased for the Alabama mill, and

construction is scheduled to begin about January 1. Operation is expected by the end of 1957.

The plant will produce 300 tons of board per day on a 216-in. Rice Barton Corp. fourdrinier with a 196-in. trim. Raw material will be a combination of soft hardwood and pine drawn from surrounding counties in Alabama and western Florida.

Water will be obtained from deep wells or the Conecuh River adjacent to the site. Waste water will be drawn off to a series of natural basins on company property.

Ebasco Services Inc. has been engaged to supervise all necessary services for the engineering, designing and construction of the plant.

Mill and Box Plant in West

Container Corp. has also revealed plans to build a boxboard mill in Santa Clara, Cal., and a folding carton plant in Seattle. The overall cost of the West Coast project will be about $7,250,000. More than $6,000,000 of the total will be devoted to the mill.

The boxboard operation will be located adjacent to the firm's Santa Clara folding carton plant on land provided when the plant was constructed in 1954. It will house one paper machine and will serve both the Santa Clara and Seattle operations.

At present, the folding carton production facilities in Seattle are located in the company's corrugated shipping container plant.

Great Lakes Paper to Install B-S Machine

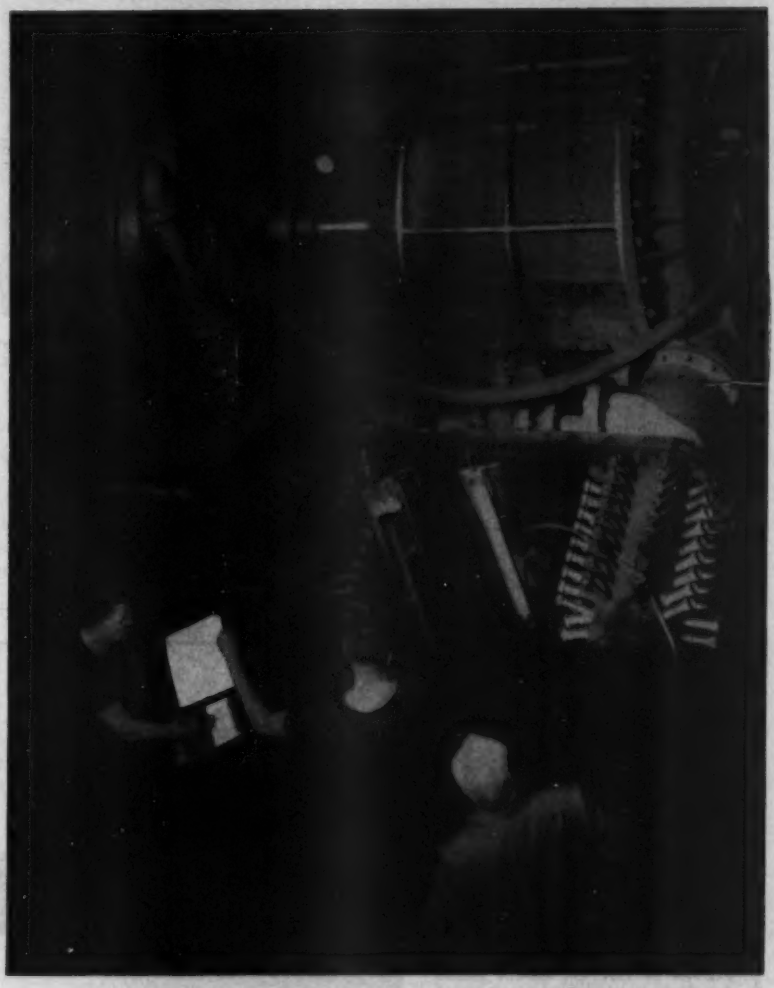
Great Lakes Paper Co. Ltd. at Fort William, Ont., has ordered a third Bagley-Sewall newsprint machine from the Black-Clawson Co. The unit will increase daily newsprint production to more than 800 tons.

The 272-in. fourdrinier machine—now being designed and built at B-C's Machine Div. in Watertown, N. Y.—will produce a daily 300 tons of 32-lb. newsprint. It will operate at speeds in excess of 2000 fpm.

Several incorporated features include a high-speed pressure headbox and slice, a permanent cantilever fourdrinier and a vacuum pickup press section.

The cantilever fourdrinier is

Rated performance of every Nash Vacuum Pump is assured by this precise laboratory test



Rated capacities of Nash Vacuum Pumps are not theoretical. Every Nash Pump is tested individually. Air capacity is determined by delivery thru accurately machined and calibrated orifices. Related vacuum is measured by precise mercury column, and horse power is recorded electro-dynamically. Records of these tests are retained by us, and certified copies are available to Nash Pump owners.

That is one of the reasons why Nash Vacuum Pumps are installed in over a thousand leading Paper Mills. An engineer from Nash will be glad to survey your mill, and make recommendations, entirely without obligation to you.

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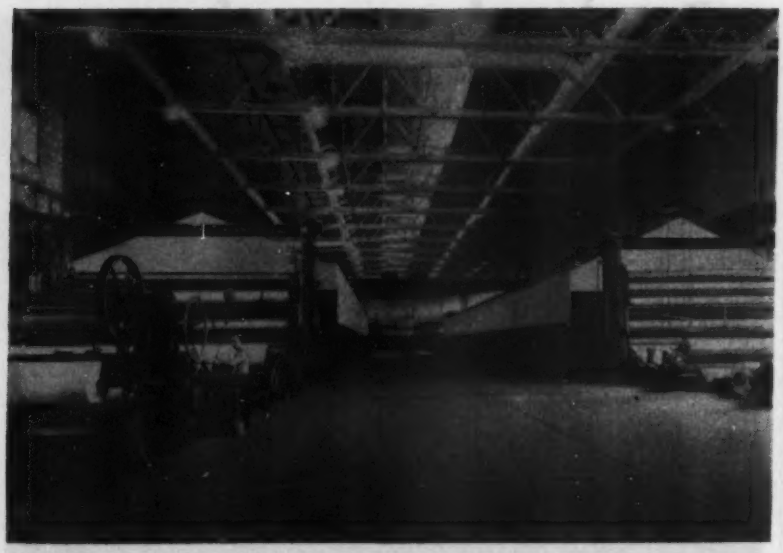


NEWSPRINT MACHINES built by Bagley-Sewall that are now in operation at the Great Lakes Paper mill. At the left is the 305-in. unit that is the largest ever built in the Western Hemisphere

equipped with a 44-in. diameter Black-Clawson suction couch integrally mounted to the last cantilever beam. The entire fourdrinier section, including the couch, retracted breast roll assembly and inside wire rolls, cantilever as a unit for rapid wire change.

Finished newsprint will be rewound and slit into standard rolls on a Bagley-Sewall Model 40 winder-slitter.

The new machine is to be installed adjacent to two other Bagley-Sewall newsprint units—one of which is the widest machine ever built in the Western Hemisphere, a 305-in. giant installed at the mill some years ago.

RES-LIN *wire saver*
SUCTION BOX COVERS
are
PROVEN by TEST

PROVEN BY TEST, this RES-LIN Suction Box Cover is establishing a new record for longer life and even wearing. It is engineered to meet the requirements of specific production problems of each particular paper machine.

10 Reasons Why You Should Use RESLIN

1. Even distribution of fabric assures EVEN WEARING.
2. Ends of threads contact wire, assuring uniform surface to wire.
3. Increased wire life.
4. Many years of trouble-free service.
5. Resurfacing reduced to a minimum.
6. Expansion and contraction is reduced to a minimum.
7. Reslin can supply a greater open area without sacrificing strength.
8. Requires no wet storage or care when machine is down.
9. Easily installed.
10. No other can offer as even-wearing and wax-like surface as Reslin.

Write for Further Information and Sample of Material

WIRE RES-LIN SAVER

APPLETON WOOD PRODUCTS CO
APPLETON, WISCONSIN

Michigan Carton Abandons Sale to Marathon

Directors of Michigan Carton Co. at Battle Creek have voted to abandon the proposed sale of the firm's assets to Marathon Corp. of Menasha, Wis.

According to Lawrence C. Fell, president of Michigan Carton, "We ran into a number of unforeseen problems that couldn't be solved. So, after working on the transaction for three months, we decided that it had to be called off." He added that the decision to terminate negotiations was mutually agreeable to both companies.

Georgia-Pacific May Build in Oregon

Georgia-Pacific Plywood Co. of Portland, Ore., may build a pulp mill at Toledo, Ore. This would be in addition to the unit planned by the firm for the Juneau, Alaska area.

Owen R. Cheatham, president of Georgia-Pacific, has reported that if the Toledo mill is built its daily capacity will be about 250 tons, approximately half that of the proposed Alaska mill. According to Mr. Cheatham, there is a perpetual source of water, power and wood in the Toledo area—plenty to support a mill turning out a predominately fir-based product.

At the present time Georgia-Pacific controls more than 11 billion feet of timber on the Pacific Coast.

Will Build in Alaska

Alaska's third pulp mill will result from the granting of a preliminary award to Georgia-Pacific Alaska Corp. of 7.5 billion board feet of timber in the Tongass National Forest in southeastern Alaska. The announcement was made by the U. S. Department of Agriculture.

Georgia-Pacific Alaska, a subsidiary of Georgia-Pacific Plywood, bid $2.80 per 1000 bd. ft. for Sitka spruce and $1.70 per 1000 bd. ft. for western hemlock and cedar. The Forest Service has estimated that if this rate of payment continues throughout the 50-year sale period, $15,000,000 will be added to the federal treasury.

Because it is a long-term timber sale, however, rates will be redetermined on January 1, 1971, and every five years thereafter to keep them in line with prevailing prices.

The timber sale contract calls for

the construction of a pulp mill in the vicinity of the sale area. The mill is to process at least 100,000,000 bd. ft. of timber annually. By 1981, the minimum annual requirement will be 160,000,000 bd. ft. The timber is located in a 500,000-acre area in the vicinity of Admiralty Island and the southern end of the Lynn Canal. Principal nearby communities are Juneau and Douglas.

Fifty Years Marked by Erving Paper Mills

One of the largest makers of paper napkins and tissue specialties — Erving Paper Mills at Erving, Mass. — recently celebrated the 50th anniversary of its founding.

The firm had its beginning in 1905 at Holyoke, when C. Elmer Pope, an inventor of some fame, made a moderate investment in equipment for the manufacture of paper specialties. Until 1916 the firm was known successively as the C. Elmer Pope Paper Co. and Erving Mills.

Early production included a line of colored tissues, napkins and decorating crepe papers. In 1909 the company purchased the land it now occupies on Millers River and broadened its line to include various papers of tissue weight and paper towels.

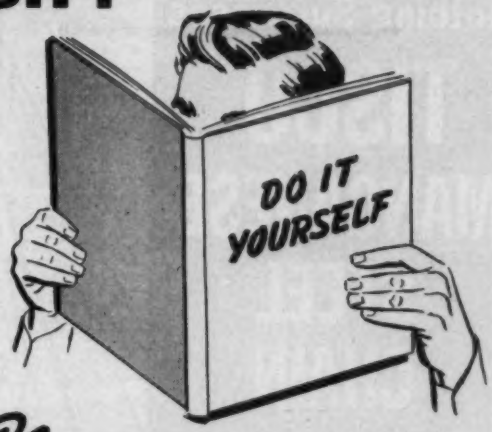
An outstanding development attributed to Erving Paper was multiply facial napkins in both wet strength and non-wet strength grades. And only last year the company introduced an all-weather windshield wipe capable of absorbing water as readily at 40°F. as at 90°F.

Survey Reveals Continued Growth in Industry

New production records, higher sales and wider profit margins have been forecast for the United States paper industry by Harris, Upham & Co., investment brokerage firm. Its study covering 12 leading paper manufacturers was recently made public.

"Indications that new production records will be achieved by the industry point to higher sales for all the leading companies and an increase in net income as profit margins widen on firming prices and

converting your own starch?



use Clinton® starches

You'll like the results when you use Clinton's 3011 and 3021 starches for enzyme conversion. They're always uniform . . . always the *same* high quality.

Use them for sizing . . . 3011 and 3021 convert uniformly to give you the desired penetration . . . increased strength . . . better printing surface. Since they convert well at high solids levels they give efficient coating . . . from application to drying. And, you can count on Clinton enzyme conversion starches for economy, too.

Count on Clinton's technicians, too, for help and advice with your paper making problems. They have the "know-how" of over 30 years experience . . . and it's all yours, just for the asking.

Quality products

FROM THE WORLD'S CORN CENTER

CLINTON

CLINTON FOODS INC.
Corn Processing Division
CLINTON IOWA

For Durability
Nothing Surpasses

TISCO® MANGANESE STEEL CHAIN

TISCO Pulp Wood Chain

TISCO Manganese Steel Chain lasts from 5 to 15 times as long as other chains in severe service.

In the Pulp and Paper Industry, TISCO Pulp Wood Conveyor Chain gives outstanding performance. The low frictional loss of manganese steel and the wide bearing area of the chain on conveyor trough result in substantial power saving and reduced wear.

TISCO Barking Drum Chain, is made to a greatly simplified design that not only increases strength but reduces the number of parts and expedites assembly. It is far and away the most economical barking drum chain made. It fits all sprockets and idlers. The center link is one integral unit. There are no bushings to work loose or break. Large bosses on the side links increase bearing on the pins, and greatly reduce both pin and link wear.

Attachment links specifically designed for most efficient log handling are readily available for use with TISCO Chain.

TISCO chain users report decreased maintenance expense from increased life of Manganese Steel Chain with fewer shutdowns for replacement.

Ask for further information regarding TISCO Chains for the Paper Industry.

TAYLOR-WHARTON Iron & Steel Co.

(Division of Harrisburg Steel Corporation)

HIGH BRIDGE 5, NEW JERSEY

Birmingham, Ala. Cincinnati, O. Easton, Pa.

80-INCH COLORING and laminating machine that has recently been installed by Mengel Co. in Fulton, N. Y. The Black-Clawson (Dilts Machine Works Div.) unit is used on bleached and unbleached kraft liner for corrugated boxes and is designed for a maximum speed of 400 fpm. The machine line incorporates a Dilts Model P-F flexographic printing press for the 7- to 9-in. diameter plate cylinder range. Auxiliary lead rollers and pressure roll are furnished for perforating two-ply laminations. The press is completely air actuated and furnished with agitation drive and pumping system. Other equipment includes two-position unwind, preheater, after heater, two-drum winder and Reliance drive

better volumes," according to the survey.

The companies involved in the study were International Paper Co., Crown Zellerbach Corp., Scott Paper Co., St. Regis Paper Co., Container Corp. of America, Kimberly-Clark Corp., West Virginia Pulp & Paper Co., the Champion Paper & Fibre Co., Marathon Corp., Robert Gair Co. Inc., the Mead Corp. and Union Bag & Paper Corp.

The study finds that "in the post-war period the paper industry has passed from a 'feast-and-famine' status to that of a growth industry, primarily because of three factors: Growth in sanitary papers used in home and industry; expansion of the supermarket and the increasing demand for one-stop shopping, and 'designed packaging' from manufacturer to consumer."

The Harris, Upham survey cites as the basic reason for continued growth in the paper industry the fact that "paper can substitute for most other materials, but there is no substitute for paper." It points to the fact that U. S. per capita consumption of paper in all forms has multiplied over 6½ times in the last 55 years.

Albemarle Paper Buys Raymond Bag Co.

Albemarle Paper Mfg. Co. of Richmond, Va., has revealed plans to purchase Raymond Bag Co. of Middletown, Ohio. Directors of both firms have approved the move, which

is now subject to stockholder approval.

Raymond Bag manufactures multiwall paper shipping sacks used for the bulk packaging of agricultural and food products, building materials, chemicals, drugs, dyes and minerals. The firm's 150,000-sq. ft. plant has a capacity use of 30,000 tons of kraft paper a year.

St. Regis Gains Interest in West Coast Firm

St. Regis Paper Co. has acquired for cash a block of stock representing an approximate 40 per cent in the stock of Growers' Container Corp. of Salinas, Cal. It is expected that proceeds from the sale of these shares will be used for expansion at the California plant.

Growers' Container manufactures fiberboard containers for the packaging of agricultural products and for industrial uses. The firm is also a converter of flexible packaging materials including polyethylene bags made of clear polyethylene film.

Coming Events

Tappi

Jan. 10—Lake States Section, Green Bay, Wis.

Jan. 12—Kalamazoo Valley Section, (joint meeting with Michigan Superintendents), Hotel Harris, Kalamazoo

Jan. 20-21—Southeastern Section, Francis Marion Hotel, Charleston, S. C.

Feb. 20-23—Annual meeting, Hotel Commodore, New York, N. Y.

American Pulp & Paper Mill Superintendents Association

Jan. 12—Michigan Division (joint meeting with Kalamazoo Valley Tappi), Hotel Harris, Kalamazoo

Jan. 26—Miami Valley Division, Manchester Hotel, Middletown, Ohio

Jan. 27—Connecticut Valley Division, Roger Smith Hotel, Holyoke, Mass.

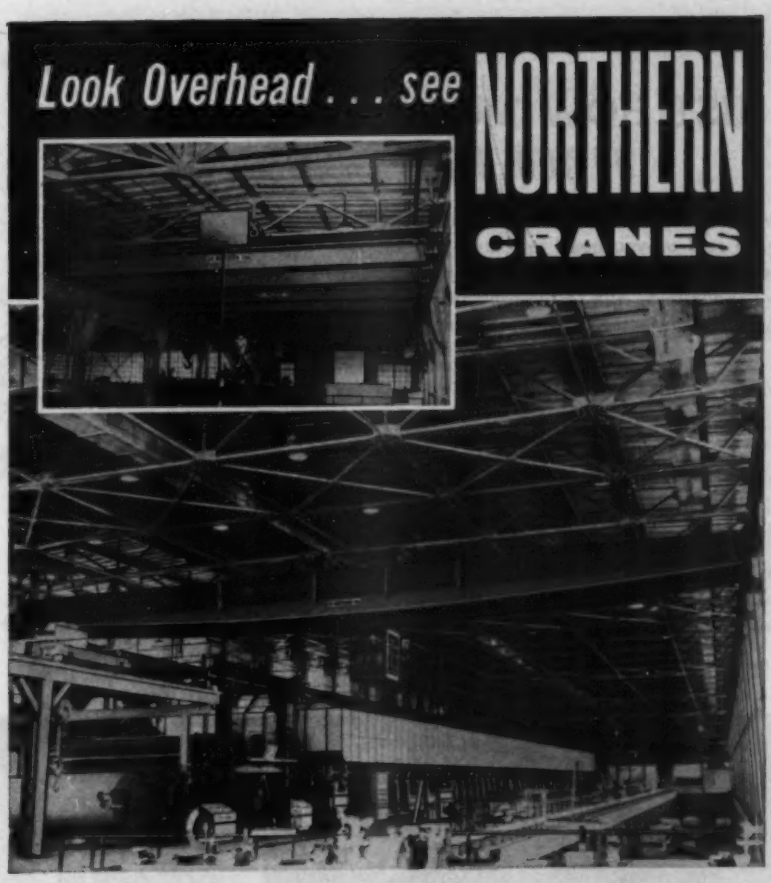
Other meetings

January—Forest Products Research Society, Inland Empire Section, Davenport Hotel, Spokane, Wash.

Jan. 25-27—CPPA Technical Section, annual meeting, Sheraton-Mount Royal Hotel, Montreal

Feb. 19-24—APPA Annual Meeting, Waldorf-Astoria Hotel, New York, N. Y.

March 8-9—American Institute of Electrical Engineers, conference on electricity in the pulp and paper industry, University of Florida, Gainesville



selected by leading paper mills

It is frequently said that there is no substitute for experience.

Rome Kraft Company's selection of NORTHERN CRANES for the machine, roll grinding, turbine and refiner rooms in its new plant at Rome, Georgia, reflects Northern's experienced responsibility for over fifty years in delivering the particular overhead materials handling service required in production type paper mills.

NORTHERN CRANES are fast, safe, dependable; designed and built for minimum maintenance, quick easy accessibility for service, for maximum efficiency of your invested capital.

NORTHERN MATERIALS HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

JUST HOW MUCH REEL *DO YOU NEED?*

With Black-Clawson Rollflyte reels you can install as much reel as you need and stop at that. The rugged new Rollflytes are available as simple, basic reels. They are equipped with air-loaded secondary arms—air loading of primary arms can be provided.

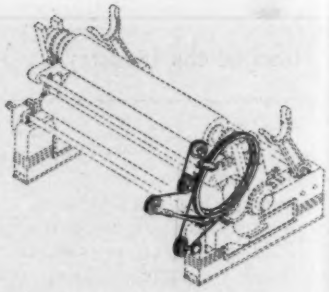
If desired, the Rollflyte can be equipped with a rope carrier, a speed-up belt for starting new spools, and a choice of either a spreader bar or spreader roll.

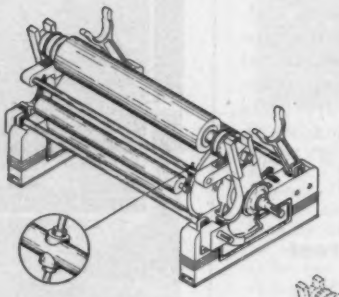
Can also be equipped with special rails upon which the secondary arms discharge full rolls of paper—for delivery directly to the unwind stands. Heavy overhead cranes for this purpose no longer required.

Will handle rolls up to 62" diameter. Minimum drum width—trim plus 6". Widths up to 175". Speeds as required.

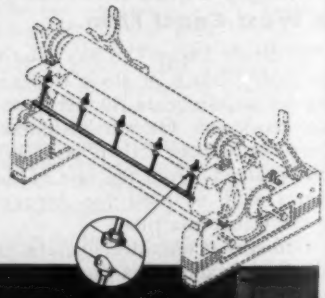
Contact Hamilton division. Ask for bulletin HB-45.

Rope carrier added

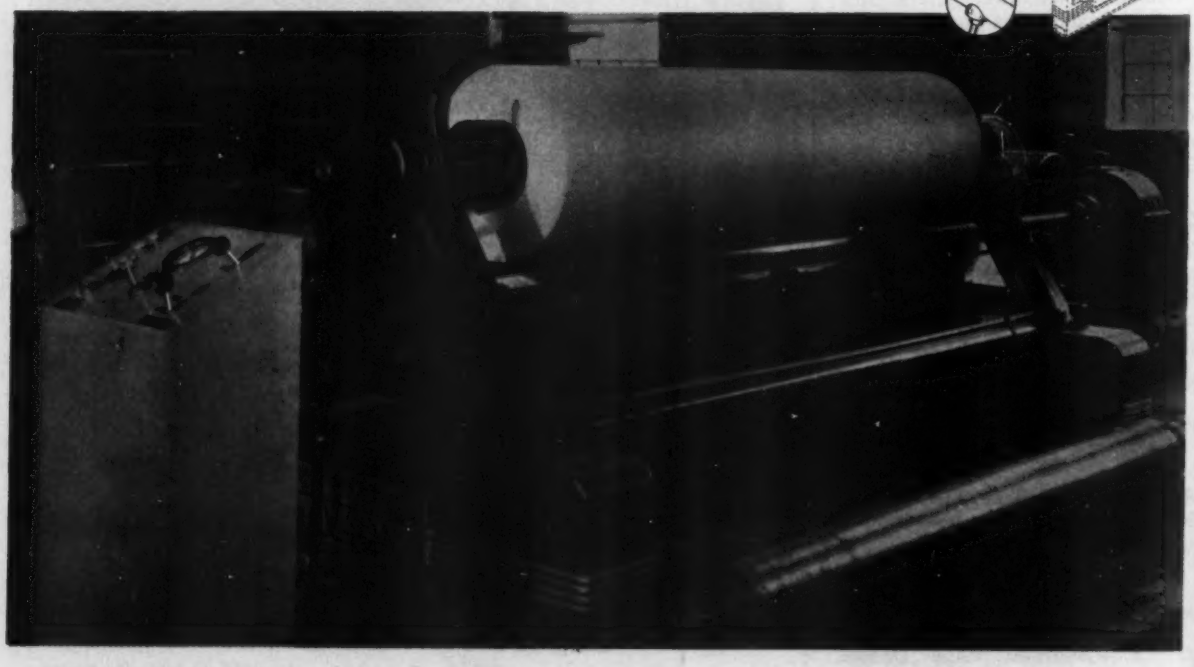




Basic reel with high crowned spreader roll



Adjustable spreader bar



The BLACK-CLAWSON Company

BLACK-CLAWSON DIVISION • HAMILTON, OHIO

PANDIA INC. DIVISION • Pulp Mill Equipment
SHARTLE BROS. MACHINE DIVISION • Stock Preparation Equipment
BAGLEY-SEWALL DIVISION • Fourdrinier Machines
DILTS DIVISION • Converting Machinery

BLACK-CLAWSON INTERNATIONAL LTD. DIV. • British-European Manufactory
BLACK-CLAWSON (CANADA) LTD. • Serving Canada

ALLIED NEWS

MLW to Make Paper Machines

Montreal (Que.) Locomotive Works Ltd. will manufacture in Canada the pulp and paper mill machinery line of the Black-Clawson Co. of Hamilton, Ohio.

An agreement between the two companies covers manufacture of equipment designed and developed by B-C for use by Canada's pulp and paper industry. Black-Clawson products are engineered, sold and seviced in Canada by Black-Clawson (Canada) Ltd.

Lockport Felt Expansion

The last remaining portion of the original Lockport Felt Co. plant in Newfane, N.Y., was removed recently to allow installation of a new wool scouring line and new wool dryer. One of the final steps in a two-year, $1,000,000 program of expansion and development, the $100,000 wool scouring and drying equipment is now in operation.

The new equipment has the dual purposes of a greater uniformity in processing the raw wool and of providing additional capacity to meet the increased production abilities of the expanded Lockport operation.

Black-Clawson to Make Suction Rolls

Concurrent with the announced termination of manufacturing activities by Downingtown (Pa.) Mfg. Co., the Black-Clawson Co. has reported that it has acquired the complete line of Downingtown suction rolls and structural board-forming machinery.

The new line of equipment is now being designed, engineered and built by Downingtown personnel who have accepted positions with B-C's Paper and Board Machine Div. at Watertown, N. Y.

In previous years, Black-Clawson has used a large number of Downingtown suction rolls in its own paper and board machine installations.

Kewanee-Ross Dissolved

American Radiator & Standard Sanitary Corp. of New York, N. Y., has announced that its wholly owned subsidiary, Kewanee-Ross Corp., has been dissolved. Two new American-Standard operating divisions have been formed to continue the K-R operations.

The action was taken in accordance with American-Standard's policy of divisionalizing its operations along major product lines.

RECENTLY COMPLETED research and engineering center of Fisher Governor Co. at Marshalltown, Iowa, boasts 100,000 sq. ft. and complete air conditioning. Performance tests can now be run on Fisher control equipment at pressures of up to 2500 psi, using air or water as the flowing medium. A series of test lines up to 12 in. in diameter are located in the acoustically-treated laboratory. Sales engineering, executive offices and general office departments are also located in the new structure

The two new divisions will be the Kewanee Boiler Div., which will manufacture Kewanee boilers, and the Ross Heat Exchanger Div., which will produce Ross heat exchangers, surface condensers and allied products.

Allied News Briefs . . .

The Babcock & Wilcox Co. has appointed Cameron & Barkley Co. of Charleston, S. C., as distributor for its seamless and welded boiler tubes. Cameron & Barkley has branches in Savannah, Ga.; Jacksonville, Orlando, Tampa and Miami, Fla.

Glidden Co. of Cleveland plans to build a plant at Port St. Joe, Fla., to adjoin the kraft mill of St. Joe Paper Co. The operation will use a papermaking by-product to turn out crude and distilled tall oil, fatty acids, tall oil rosin and tall oil pitch.

Link-Belt Co. has announced that a plan for exchange of shares between Link-Belt and Syntron Co. of Homer City, Pa., has become effective. Syntron will be operated as a Link-Belt subsidiary. Syntron manufacturers electromagnetic and electronic equipment.

The merger of **Consolidated Chemical Industries** into **Stauffer Chemical Co.** has been approved by stockholders of both firms.

Morden Machines Co. of Portland, Ore., has appointed Brandon Sales Inc. of Greenville, S. C., as sales representative in the southern and southeastern states for Morden stock preparation equipment.

Hercules Powder Co. has announced plans for an expansion of its rosin and rosin size plant at Savannah, Ga. Part of the expansion will include a unit for the processing of crude tall oil. Completion of the project is scheduled for 1956.

Hercules Assignments

An organizational realignment in the Synthetics Department sales division of Hercules Powder Co. has been announced by the firm:

John E. Copeland, field sales manager; George E. Osburn, sales manager, Wilmington District; John S. Autenrieth, industry sales manager for adhesives, printing ink, petroleum and plastics; J. G. Little, industry sales manager for paint, varnish and lacquer; Henry D. Heiser, sales manager, Houston District; B. J. Dougherty, sales manager, St. Louis District, and Cliff S. Skow, resident technical representative, Los Angeles District.

Albany Felt Appointments

James E. Smith has been appointed sales manager of the Paper Machine Felt Div. of Albany Felt Co., Albany, N.Y. Formerly assistant sales manager, he joined the firm in 1945. He was at one time an industrial engineer for Bird & Son inc.

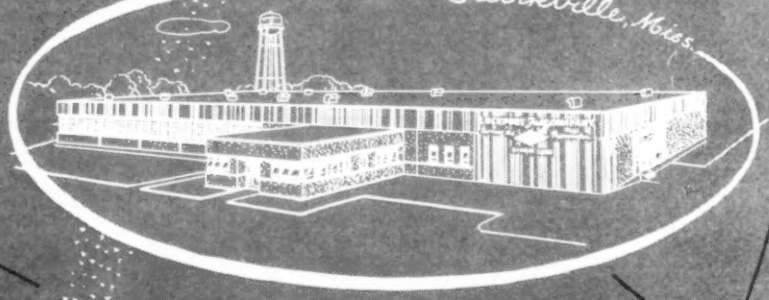
Other appointments listed by the company: Ray R. Dustrude, formerly assistant sales manager, as field sales manager; and

from North

Newfane, N.Y.

and South...

Starkville, Miss.



To Our Friends in the Paper Industry...We Join in Wishing The Merriest Christmas and the Very Best in the New Year

LOCKPORT FELT COMPANY

NEWFANE, N.Y. • STARKVILLE, MISS.

Serving the Paper Makers Since 1891

Allied News . . .

J. E. Smith

R. R. Dustrude

M. T. Reynolds

P. T. Gates

Marcus T. Reynolds, formerly a sales engineer in the Midwest, as assistant sales manager.

Albany Felt also recently announced that Percival T. Gates, who was formerly president of Drycor Felt Co. at Staffordville, Conn., has joined the Albany firm as a research consultant.

M. H. Bennett

T. E. Detcher

Chemical Linings Changes

Chemical Linings Inc. of Watertown, N. Y., has announced the following personnel changes:

Murray H. Bennett, founder and formerly president, becomes chairman of the board. T. E. Detcher, formerly vice president and technical director, is now president. Elgin A. Branche, formerly secretary and treasurer, becomes vice president and treasurer.

Allied Personalities . . .

Henry M. French, formerly with Florida Portland Cement Co., has been assigned to the Tampa district of Allis-Chalmers Industries Group.

William W. Bryan, who has been with the firm since 1934, has been appointed manager of General Electric Co.'s Construction Materials Pacific District. He will be located in Los Angeles.

Carl Claus has been named director of staff of the Babcock & Wilcox Co. Mr. Claus, who joined the firm in 1931, will coordinate various staff functions and will supervise the activities of the following departments and personnel: patent, New York office, student recruitment and training, employee training, director of purchasing, public relations, advertising and publicity.

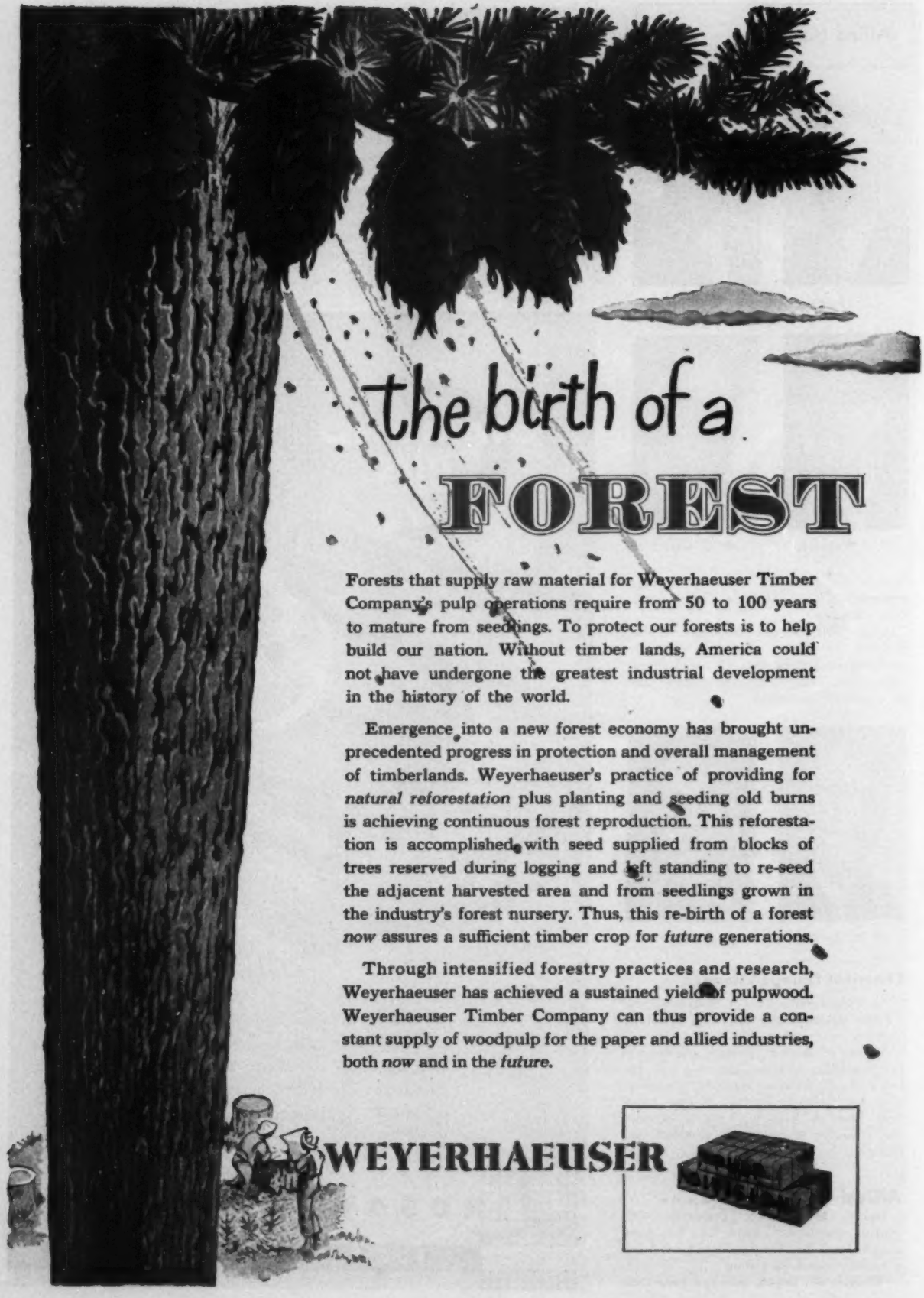
Richmond M. Stampley has been made manager of the Western Filtration Div. of Dorr-Oliver Inc. Formerly a sales engineer, he will be in charge of the marketing of all Dorr-Oliver filtration equipment in the 11 western states.

Henry V. Bootes, vice president of ACF Industries Inc., has been made a member of the operating committee and head of the marketing department of the corporation.

S. B. Scott has been made director of sales for the Michigan Alkali Div. of Wyandotte Chemicals Corp. He will be directly responsible for all sales and sales activities of the division.

William E. French Jr. has joined the staff of Williams-Gray Co. of Chicago. He has been associated with the machine clothing business for the past 10 years.

DIAMOND
DIES
LINDSAY
As an early measure in controlling the quality of Lindsay Fourdrinier wire cloth, we operate our own diamond die shop. The selection of diamonds is followed by mounting, piercing and polishing. Accuracy is paramount. The Lindsay Wire Weaving Company, Cleveland 10, Ohio.
INDSAY WIRES
Since 1904
FOR PAPER MANUFACTURING



the birth of a FOREST

Forests that supply raw material for Weyerhaeuser Timber Company's pulp operations require from 50 to 100 years to mature from seedlings. To protect our forests is to help build our nation. Without timber lands, America could not have undergone the greatest industrial development in the history of the world.

Emergence into a new forest economy has brought unprecedented progress in protection and overall management of timberlands. Weyerhaeuser's practice of providing for *natural reforestation* plus planting and seeding old burns is achieving continuous forest reproduction. This reforestation is accomplished with seed supplied from blocks of trees reserved during logging and left standing to re-seed the adjacent harvested area and from seedlings grown in the industry's forest nursery. Thus, this re-birth of a forest *now* assures a sufficient timber crop for *future* generations.

Through intensified forestry practices and research, Weyerhaeuser has achieved a sustained yield of pulpwood. Weyerhaeuser Timber Company can thus provide a constant supply of woodpulp for the paper and allied industries, both *now* and in the *future*.

WEYERHAEUSER

NAMES *in the* NEWS

FIFTY-FIVE YEARS of service with Gardner Board & Carton Co. were marked recently when E. T. Gardner (center), board chairman, received a lapel pin to mark the occasion. Making the presentation is his brother, Colin Gardner (l), president of the firm and himself a 46-year veteran. Looking on at the right is another brother, Robert Gardner, senior vice president, who recently celebrated his 45th year

Gardner Marks 55th Year

E. T. Gardner, chairman of the board of Gardner Board & Carton Co., recently marked his 55th anniversary with the firm that his father helped to establish.

For the first nine of those 55 years, Mr. Gardner was sales manager and treasurer of the Middletown, Ohio company. In 1917 he became president, a post he held 37 years.

In a recent statement, Mr. Gardner declared, "In my 55 years of association with the paperboard and carton industry I have seen it grow from a small handicraft operation to a multi-billion dollar business. This development has made and is making a major contribution to mass distribution and mass selling techniques.

"The folding carton is more responsible than any other factor for the success of self-service marketing. I foresee a great future for our industry in further similar developments."

From one small mill with 48 employees in 1900, Gardner Board & Carton has become a business employing 2000 people in three board mills, two carton plants, and the largest retail box plant in the world. Gardner wholly-owned subsidiaries include Manchester Machine Co., the Gardner Container Co., the Dayton Paper Stock Co. and the Yoder Engraving Co. Gardner also shares ownership in Dairypak Inc.

Hano Succeeds Florio at Marvellum

Robert Hano has been elected president of Marvellum Co. of Holyoke, Mass., to succeed the late Stephen Florio. (Mr. Florio was also president and treasurer of the firm, but no successors have been named to these posts.)

Mr. Hano has been a director of the firm since 1949. For the past several months he has been serving the company in an advisory capacity. He resigned earlier this year as treasurer, general manager and a director of Philip Hano Co. and as president and treasurer of Technicarbon Co., both of Holyoke.

Dr. E. L. Lovell

Dr. R. L. Mitchell

Rayonier Names Heads for Two Laboratories

Drs. Edwin L. Lovell and R. Logan Mitchell have been named to head up two new research laboratories of Rayonier Inc.

Dr. Lovell, formerly research manager at the firm's Olympic Research Div. in Shelton, Wash., becomes director of research for Alaska Pine & Cellulose Ltd., a Rayonier subsidiary.

Dr. Mitchell, who has been research supervisor at Shelton, will become research manager at the new Eastern Research Div. in Whippany, N. J., which will be in operation in mid-1956.

In another Rayonier appointment. B. W. Haskell has been named field project engineer for the firm's new $25,000,000 chemical cellulose mill at Jesup, Ga. Mr. Haskell joined Rayonier in 1946 as a staff engineer. He has since served as resident engineer at the Fernandina Beach, Fla. Div. and as assistant manager in charge of engineering and maintenance at the Jesup Div., which was placed in operation in June 1954.

Ernest P. Davis, assistant manager of woodland operations in Georgia and Florida, has been named operating manager of Rayonier's Southeast Timber Div. He has been with the firm since 1940.

W. A. McKenzie

M. W. Olson

Simpson Promotes McKenzie

William A. McKenzie has been named chief engineer for Simpson Paper Co. in Everett, Wash. He will supervise all engineering and maintenance activities, including such fields as cost control engineering, long-range research and development for products, methods and equipment, and company representation before local and state regulatory bodies.

Mr. McKenzie joined the Simpson organization from Rayonier Inc. more than 14 years ago. Before coming to Everett, he organized Simpson's first engineering department to design and construct the insulating board mill at Shelton, Wash. He was subsequently responsible for design and construction of Simpson's major installations at Shelton and McCleary, Wash., Arcata and Klamath, Cal., and at Kalamazoo, Mich.

Also announced was the appointment of Melvin W. Olson as plant engineer in charge of all maintenance, including steam power production and plant facilities.

Fraser Honors Crabtree

At a recent meeting of the board of directors of Fraser Companies Ltd. in Montreal, Aubrey Crabtree was presented an engraved gold watch in recognition of his 25 years with the

RECOGNITION OF 25 years of service with the firm came recently to Aubrey Crabtree (r), president and general manager of Fraser Companies Ltd. Here, he receives an engraved gold watch from Harold Crabtree, chairman of the board

firm. He is president and general manager and a director of the firm and its subsidiaries, Restigouche Co. Ltd. and Fraser Paper Ltd. The presentation was made by Harold Crabtree, chairman of the board.

A member of the third generation of a famous Canadian papermaking family, Mr. Crabtree was born in Joliette, Que. From 1920 to 1928 he was with Edwin Crabtree & Sons at Sunapee, N. H., Adams Paper Co. in Wells River, Vt., and Howard Smith Paper Mills Ltd. at Crabtree Mills and Beauharnois, Que. In 1928 Mr. Crabtree became general superintendent of Canada Paper Co. in Windsor Mills, Que., and was later named resident manager. In 1930 he was made general superintendent of the Madawaska, Maine paper mills of Fraser Paper Ltd. He became manager of the Madawaska mills in 1933 and in 1935 was named general manager of Fraser Paper Ltd. In 1940 he was appointed vice president and general manager of Fraser Companies Ltd. and its subsidiaries. In the following year he was promoted to his present position as president and general manager.

Stafford and Handler Retire at Neenah

Neenah Paper Co. of Neenah, Wis., has announced the retirements of I. J. Stafford, vice president for manufacturing, and of Walter Handler, mill superintendent.

Mr. Stafford came to Neenah as general superintendent in 1923. He was elected a director in 1926, made director of mill operations in 1951 and elected vice president for manufacturing in 1953. Previous to his association with Neenah, Mr. Stafford was with Dow Chemical Co., Strathmore Paper Co. and American Writing Paper Co.

Names in the News . . .

Mr. Handler began working for the firm as a fourth hand in 1907 and for the past 17 years has been first assistant and subsequently mill superintendent.

Mr. Stafford will be succeeded by Dr. Alan Adrian as operations manager, while Anton Liebhauser will be the new mill superintendent.

Walker Hamilton

F. S. Leinbach

G. L. Bidwell Jr.

J. B. Lockhart Jr.

Hamilton Retires at Riegel; New Officers Named

Walker Hamilton, president of Riegel Paper Corp. and associated with the company 34 years, retired effective December 1. He will continue as a director and will serve as a consultant to the corporation.

Succeeding Mr. Hamilton as president is John L. Riegel, who continues as chairman of the board and as the firm's chief executive officer.

A graduate of the University of Pennsylvania, Mr. Hamilton joined Riegel in 1921 as a member of the engineering department. In 1925 he was made purchasing agent and three years later was named secretary. Mr. Hamilton became a vice president in 1936, executive vice president in 1945 and president in 1951.

The board also elected Frederick S. Leinbach and G. Lamont Bidwell Jr. as vice presidents. Mr. Leinbach will continue as assistant general sales manager and Mr. Bidwell as Milford mill manager.

Ward D. Harrison, vice president in charge of production, was made vice president and general manager of production. Elected secretary was J. Bicknell Lockhart Jr., manager of merchant and industrial sales.

In another Riegel appointment, Dr. C. Richard Calkins of the technical staff has been advanced to the position of director of research at the firm's four New Jersey mills. A graduate of the Institute of Paper Chemistry, he will be responsible for all research and development of glassine, greaseproof, converted and industrial specialty papers.

Mando Appoints Three

E. O. Wood, resident engineer at the O-M newsprint plant in Kenora, Ont., will act as a full-time liaison between Minnesota & Ontario Paper Co. and H. A. Simons Ltd., who are responsible for plant design and supervision of construction in connection with the production expansion project at Kenora. Mr. Wood joined Mando in 1945 as a junior engineer at Fort Frances, and in 1950 he was transferred to Kenora.

J. W. G. Belanger, Kenora engineer, will be promoted to plant engineer, taking over the mill maintenance responsibilities vacated by Mr. Wood. Mr. Belanger joined the company in 1946 at Kenora.

William M. Gow will be promoted from the company's Fort Frances electrical engineering staff to the position of senior electrical engineer attached to the company's central engineering division. His first assignment will deal primarily with the Kenora project, where he will specialize in electrical engineering. Mr. Gow first joined Mando in 1946.

Thomas B. McCabe, president of Scott Paper Co., Chester, Pa., has been elected a director of Campbell Soup Co.

Robert A. Demund Jr. has been promoted to superintendent of the machine coated color plants of Oxford Paper Co. He joined the research department of Oxford Paper in 1930.

A&P Corrugated Box Corp. of Lowell, Mass., has announced the following changes at the board mill division: **S. Appel** as executive vice president; **H. U. Scharin** as mill manager, and **R. L. Meyers** as mill superintendent.

Paul C. Baldwin, a vice president of Scott Paper Co., has been elected

a director of the firm. In charge of West Coast manufacturing operations, he has recently assumed the additional responsibility of directing the company's staff engineering, research and development activities at its Chester, Pa. headquarters.

P. M. Chiuminatto, secretary-treasurer of Charmin Paper Mills Inc. of Green Bay, Wis., has been elected to the Charmin board of directors. Mr. Chiuminatto was appointed secretary-treasurer in 1939.

P. M. Chiuminatto

R. J. Pfotenhauer

Robert J. Pfotenhauer has been named assistant secretary of Charmin Paper Mills Inc., Green Bay, Wis. He joined the firm in 1950 and became office manager in 1953, a position he continues to hold along with that of insurance manager.

Necrology . . .

John C. Wood

John C. Wood

John C. Wood, vice president of KVP Co., Kalamazoo, Mich., died recently of a heart attack at 55.

Mr. Wood started to work for the company in 1924 shortly after his graduation from the University of Michigan. His first job was as a helper on a waxing machine. He became superintendent of the converting department in 1943 and soon assumed management of all converting operations. Later his duties were expanded to include management of all the firm's manufacturing operations in the United States.

He became a vice-president of the company in 1947.

Gustaf A. Peterson

Gustaf A. Peterson, vice president of Rice Barton Research Corp., passed away recently at the age of 61.

Mr. Peterson joined Rice Barton Corp. in 1930 as chief engineer and then served as sales engineer before going to Washington in 1942 as engineering consultant in WPB's paper machinery division.

In 1949 when Rice Barton Corp. formed Rice Barton Research Corp. as a wholly owned subsidiary, Mr. Peterson was named vice president of Rice Barton Research.

Stephen Florio

Stephen Florio, 47, president and treasurer of Marvellum Co., Holy-

In the death notice for D. Clark Everest in the November issue he was referred to as "retired chairman of the board of Marathon Corp." This was in error. He held that position at the time of his death. He had, however, retired as board chairman of the firm's Canadian subsidiary, Marathon Corp. of Canada Ltd.

Alamask

The original masking agent for kraft mill odor abatement.

Abatement

Improved product design makes possible malodor abatement in gaseous and liquid effluents from sulphate operations.

Assistance

"Alamask"® and Rhodia's experienced engineering section can assist the kraft pulp industry in its study and efforts to abate malodorous sulfur compounds.

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From Rhodia, Inc., New York,

Based on your answers to 26 simple questions, our technical staff can tell you how Alamask will help you negate your mill malodors. Send for the questionnaire today.

Rhodia INC.

Rhodia, Inc., Industrial Deodorants (Alamask) Division
230 Park Avenue, New York 17, N. Y.
Please send the "Alamask Odor Abatement Questionnaire" to:

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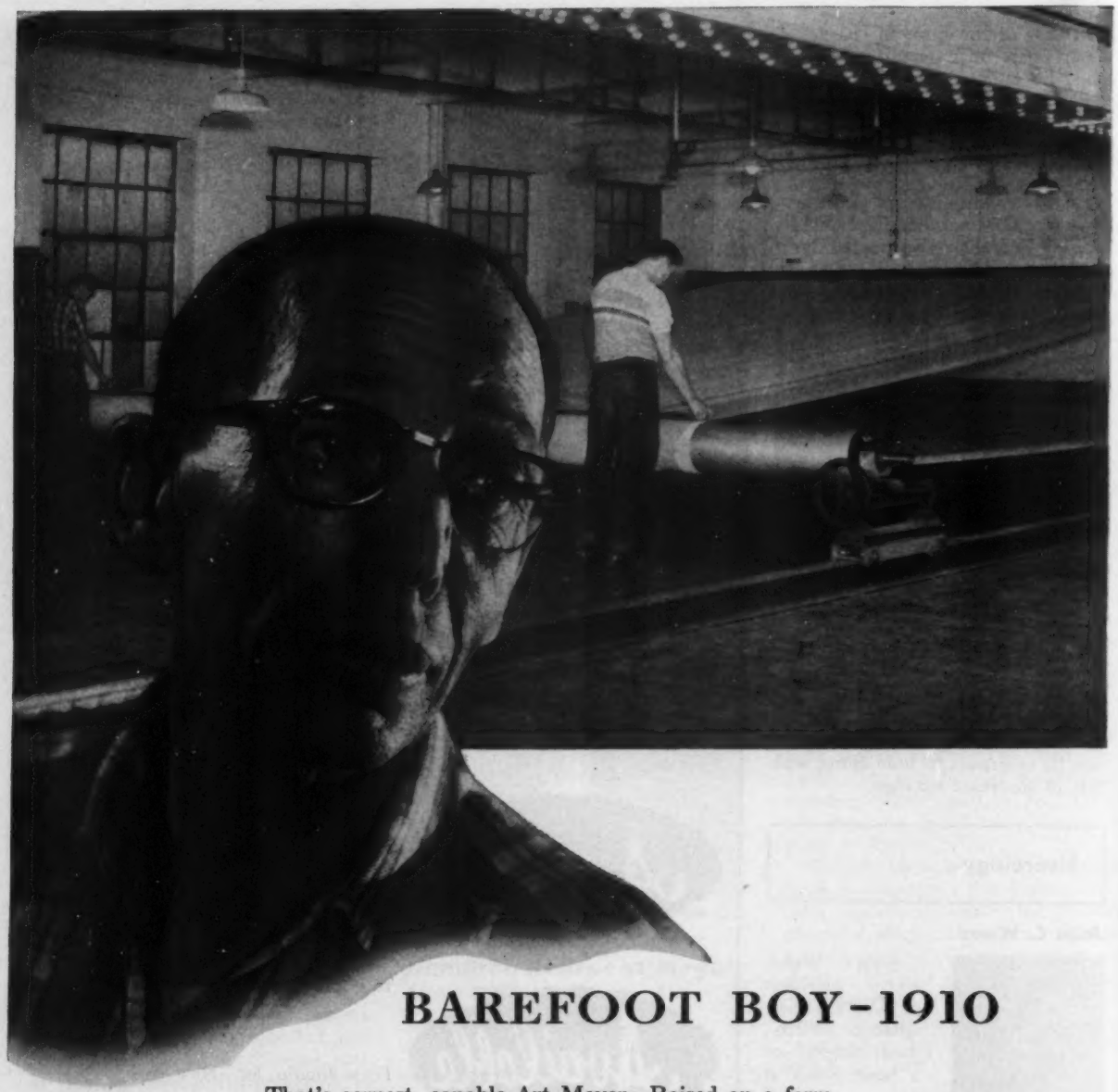
COMPANY_____

ADDRESS_____ PI



BAREFOOT BOY-1910

That's earnest, capable Art Meyer. Raised on a farm, Art was a crack rabbit hunter, but he never skipped a daily chore. And for 30 years his on-the-job reliability has been reflected in the dependable performance of the felts he helps produce. Art's in the dry finishing section—a specialist in the napping operation which teasels soft felt surfaces for certain paper-making requirements.

The skill and experience of Art Meyer, and others like him, are characteristic of the Appleton Woolen Mills . . . a 73-year-old organization dedicated to development, progress, and the production of ever finer felts—for the finest paper-making.

APPLETON WOOLEN MILLS

APPLETON, WISCONSIN

H-S PACKAGING MACHINES

In addition to paper and film processing machines H-S produces the versatile, high speed CAMPBELL Wrapper. Get complete details today.

Per minute... Per man-hour... Per dollar...

You get MORE PRODUCTION

with a HUDSON-SHARP FLEXOGRAPHIC PRESS

- Fast, flexible color changes
- Controlled unwind and rewind
- Specially designed splash-proof fountains
- Ball bearing rollers through-out
- Automatic throw-off for each color
- Space saving modern design
- Full range of narrow and wide widths, large or small print repeats.

With Hudson Sharp Flexographic (aniline) printing presses you're assured of trouble-free, high speed, heavy-duty production on papers, light-weight boards and other materials for years to come—and, with top quality results! Unusually sturdy construction plus highly precisioned, smooth running operating parts are the answer. Press illustrated may be built to accommodate webs from 30" to 50" wide and from 50" to 90" with print repeats from 10" to 36". It is available with one to four color stations and features Hudson Sharp's new splash-proof ink fountains, positive controlled feed, automatic impression throw-offs, continuous fountain operation, accurate running register and many other highly desirable features. Press is constructed to operate from roll to roll or roll to sheet — or in conjunction with bag machines or other converting equipment on "in-line" production. Complete specifications and details upon request.

HUDSON-SHARP

MACHINE CO · GREEN BAY · WIS

Manufacturers of

Printers, Embossers, Folders, Interfolders, Waxers, Laminators, Wrapping Machines, Core Winders, Packaging Presses, Creepers, and Napkins, Toilet Tissue and Paper Towel Units

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Write for new brochure showing our complete line of machines for processing paper, film and foil products. No obligation, of course!

Necrology . . .

oke, Mass., and nationally known figure in the papeterie industry, died recently of a heart attack in Reading, Pa.

Mr. Florio had been president and treasurer since February, having served as vice president and general manager before his promotion.

He began his career in the paper field as a salesman for Fitchburg Paper & Bag Co. and was associated with American Tissue Mills, Holyoke, and Fabricon Products Inc., Detroit, before joining Marvellum in 1949.

Henry H. Allen

Henry Hubbard Allen, 82, retired vice president of Bemis Bros. Bag Co., died recently at his summer home in Huntington, L. I.

A native of Omaha, Neb., Mr. Allen became superintendent of Bemis' Omaha plant at the age of 19. He subsequently served as manager of plants in Kansas City, Mo., St. Louis and Brooklyn.

He later became vice president in charge of eastern affairs for the firm, which has headquarters in Boston and St. Louis. He held patents on manufacturing processes for textile and paper bags. Mr. Allen retired in 1953 after 41 years as a director of the firm.

George Skakel Sr., chairman of the board of directors of Great Lakes Carbon Corp., and his wife Ann died recently when a company plane in which they were passengers crashed near Union City, Okla.

Lyle K. Mayne, 53, manager of the Woodbridge, N. J. plant of American Cyanamid Co., died recently of a heart ailment. He had been associated with the firm since 1923.

Louis H. Everlien, 62, central Atlantic states representative for the Appleton Woolen Mills, Appleton, Wis., died recently. Mr. Everlien was associated with Appleton since 1930.

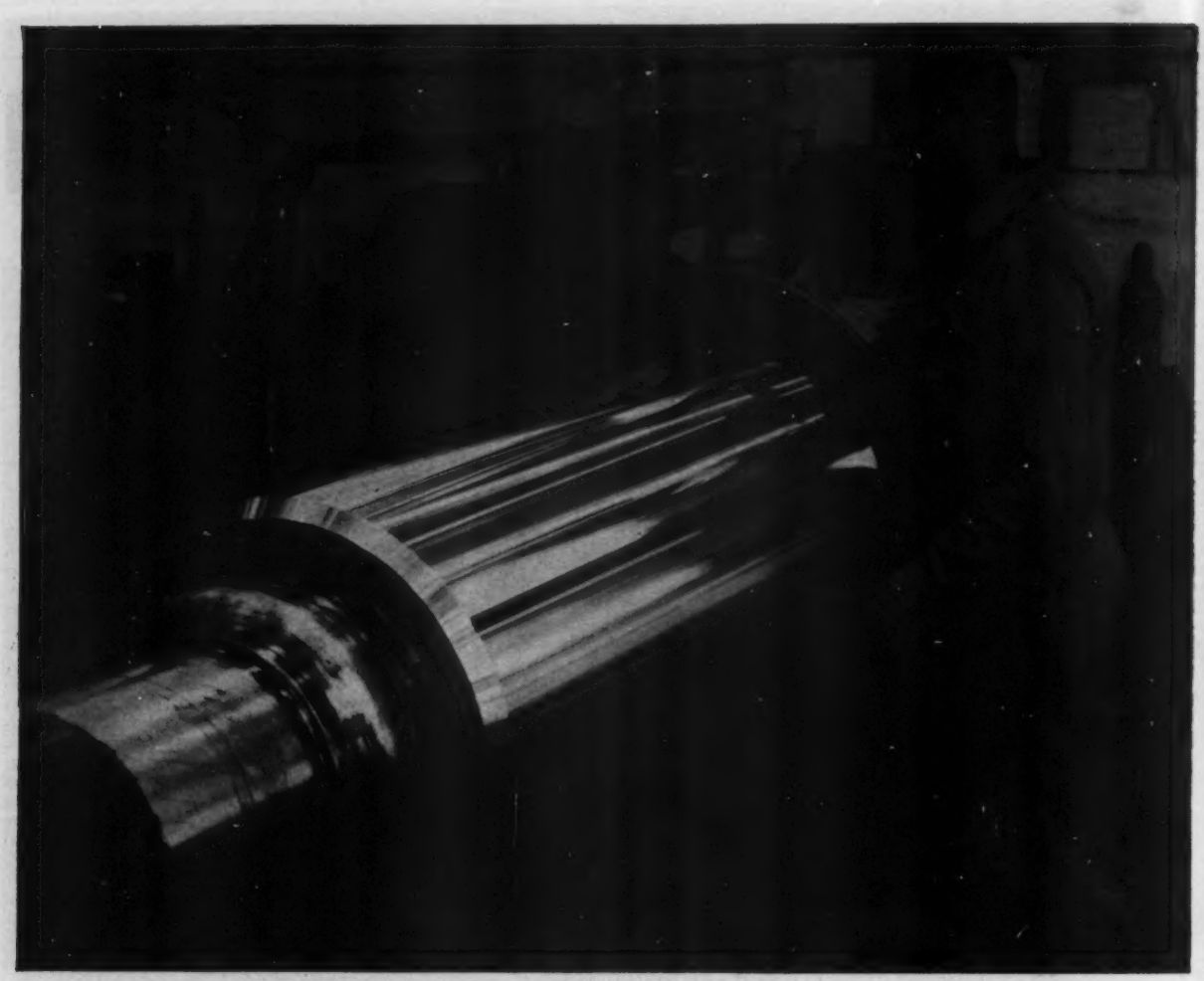
Edwin C. Knoernschild, 77, former president of the Pulprocess Co. of Milwaukee, Wis., passed away after a long illness. Mr. Knoernschild was associated with the paper and cellulose manufacturing firm since 1925.

Lester C. Hanes, 37, sales manager for Pacific Forest Products Inc. of Seattle, Wash., died in October after a brief illness.

Chester O. Dickie, president and manager of Paper Mills Agency Inc., died at 67 in his Mercer Island, Wash. home after a long illness. He gained experience with paper companies before establishing his own business in 1926.

Donald B. Bradner, 63, former research executive with the Hamilton (Ohio) Div. of the Champion Paper & Fibre Co., died suddenly in his Washington, D. C. home. He had been connected with Champion from 1926 to 1946 and with E.I. du Pont de Nemours & Co. Inc. until his retirement in 1954.

Anthony E. Loth, production manager for Hinde & Dauch Paper Co. in Cleveland, died recently at 64. He started with the company 45 years ago in Sandusky and was transferred to Cleveland in the middle 1920s.



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SAFETY NEWS

Buckeye Cotton Oil Sets Pulp Mill Record

Procter & Gamble Co. has completed what it calls a "grand slam" in world safety records in all its manufacturing operations with the announcement that the cellulose pulp mill of its Memphis, Tenn. subsidiary, Buckeye Cotton Oil Co., has set a new mark in the pulp industry.

At the end of September, the 653 employees at the Memphis plant had worked since August 1953 without a lost time accident, or a total of 2,617,756 man-hours. This exceeds the record held by Longview Fibre Co. at Longview, Wash.—2,612,656 man-hours.

In the three other fields in which P&G has manufacturing operations—soaps and related products, fats and oils, and shell-loading (explosives)—the company already holds worlds records for employee safety on the job

On the completion of Buckeye's record performance, Walter L. Lingle Jr., P&G executive vice president, declared that, "Our management and hourly-paid people have shown over a long period of time that they could work together to find intelligent ways of meeting problems as an effective producing team".

At a recent ceremony, the Buckeye plant received the Award of Honor of the National Safety Council.

65 Firms Report Perfect Scores for Nine Months in NSC Contest

A 4-PER CENT rate increase from the same period of last year has been reported during the first nine months of the 1955 Paper Industry Safety Contest sponsored by the National Safety Council.

For the period, 65 of the 527 contestants maintained perfect scores. This compares to 83 for the first nine months of 1954.

The September frequency rate for all divisions was 7.61, while that for the three quarters was 7.54, up 4 per cent from last year. In the Pulp & Paper Div. the nine-month rate was 7.34, up 6 per cent from a year ago. In Paper Converting the rate was 8.09, showing no change from 1954. In Pulpwood Logging, the rate for the period was 88.71, down 11 per cent from last year.

Perfect scores recorded for the January-September period were as follows:

Division I—Pulp and Paper Mills

Group A

None

Group B

P. H. Glatfelter Co., Spring Grove, Pa.
Crossett Paper Mills, Crossett, Ark.

Group C

West Virginia Pulp & Paper Co., Williamsburg, Pa.
National Vulcanized Fibre Co., Yorklyn, Del.
Neenah Paper Co., Neenah, Wis.
Abitibi Power & Paper Co. Ltd., Fort William, Ont.
Fraser Companies Ltd., Newcastle, N. B.
Price Bros. & Co. Ltd., Jonquiere, Que.

Group D

Certain-Teed Products Corp., East St. Louis, Ill.
Container Corp. of America, Los Angeles
National Container Corp. of Virginia, Big Island, Va.
The Mead Corp., Wheelwright Div., North Leominster, Mass.
Central Fibre Products Co. Inc., Tama, Iowa
Bartgis Bros. Co., Ilchester, Md.
Strathmore Paper Co., Woronoco No. 1, Woronoco, Mass.
Certain-Teed Products Corp., Pryor, Okla.
U. S. Gypsum Co., Gypsum, Ohio

Group E

Celotex Corp., Metuchen, N. J.
Spaulding Fibre Co. Inc., Milton Plant, North Rochester, N. H.
Robert Gair Co. Inc., Middletown, Ohio
Celotex Corp., Madison, Ill.
Central Fibre Products Co. Inc., Denver, Colo.
American Writing Paper Corp., Nonotuck Div., Holyoke, Mass.
Flintkote Co., Mt. Carmel, Ill.
Kimberly-Clark Corp. of Canada Ltd., Kapuskasing, Ont.
Logan-Long Co., Amalgamated Roofing Mills Div., Chicago
Container Corp. of America, Wilmington, Del.
International Paper Co., Livermore Falls, Maine
Munroe Falls Paper Co., Munroe Falls, Ohio
International Paper Co., Riley, Maine
National Vulcanized Fibre Co., Marshall Bros. Div., Yorklyn, Del.
Hammond Bag & Paper Co., Wellsburg, W. Va.

Division II—Paper Converting

Paper Bags

St. Regis Paper Co. Ltd., Three Rivers, Que.
Crown Zellerbach Corp., Los Angeles
St. Regis Paper Co. Ltd., Vancouver, B. C.
Thilmany Pulp & Paper Co., Kaukauna, Wis.
St. Regis Paper Co. Ltd., Dryden, Ont.
Pillsbury Mills Inc., Wellsburg, W. Va.

Boxes and Cartons

Group A

General Foods Corp., Carton & Container Div., Battle Creek, Mich.
Container Corp. of America, Carton Div., Boston
Bartgis Bros. Co., Ilchester, Md.
Container Corp. of America, Container Div., Chattanooga, Tenn.
The Mengel Co., Louisville, Ky.

Group B

Gaylord Container Corp., Atlanta, Ga.
Gaylord Container Corp., Greenville, S. C.
Container Corp. of America, Carton Div., Cleveland
Container Corp. of America, Santa Clara, Cal.
Container Corp. of America, Boyle Ave. Plant, Los Angeles
Container Corp. of America, Carton Div., Chattanooga, Tenn.
Container Corp. of America, Baltimore
Fort Wayne Corrugated Paper Co., Rochester, N. Y.
Robert Gair Co. Inc., American Coating Mills Div., Grand Rapids, Mich.
Hoerner Boxes of Fort Worth Inc., Fort Worth, Texas
Dairypak Inc., Cleveland
Bay West Paper Co., Green Bay, Wis.

Roofing Paper

Bird & Son inc., Chicago
Certain-Teed Products Corp., Kansas City, Mo.
Ruberoid Co., Minneapolis
Flintkote Co., Portland, Ore.

Insulation and Building Board

Armstrong Cork Co., Macon, Ga.

Specialties

Canadian Cellucotton Co., Niagara Falls, Ont.
Lily-Tulip Cup Corp., Augusta, Ga.
International Paper Co., Kansas City, Kans.
Mid-West Wax Paper Co., Fort Madison, Iowa
Lily-Tulip Cup Corp., Monticello, Ind.

Division III—Pulpwood Logging

None

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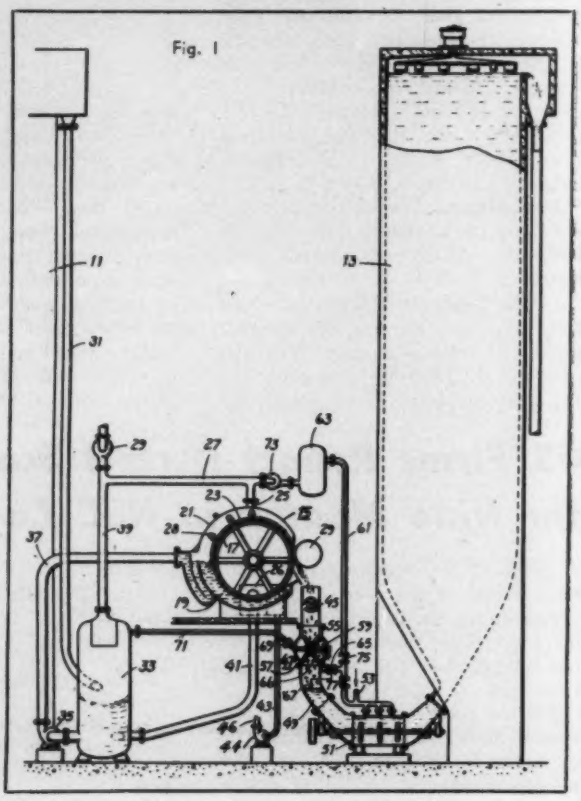
Sartell, Minn.

PATENT REVIEWS

MELVIN NORD*



Bleaching Plant

U.S. 2,706,390, issued April 19, 1955, to Rolf J. Johansen and assigned to Aktiebolaget Separator, describes a plant for bleaching pulp.

The plant is shown in Fig. 1. The numerals 11 and 13 designate high concrete towers in which bleaching reactions take place during the continuous upward movement of the pulp. The pulp is transferred from the top of tower 11 to the bottom of tower 13, during which transfer the reaction products resulting from the preceding bleach are washed off in a pressure air filter 15, and a new bleaching agent is mixed in with the washed pulp. The filter 15 consists of a rotary cylindrical drum 17 having a perforated shell, a cover enclosing the drum and forming a pulp vat 19 in which the drum is partly immersed, and a closed hood 21 covering the top of the drum which carries a continuous pulp web 23. The hood 21 has a pressure air inlet 25, which is connected by means of a pipe 27 to blower 29 which takes air in from the atmosphere and raises it to the desired pressure. The air thus introduced into the hood 21 is pressed through the pulp web 23, displacing water from it, the water being collected in a box 26. Wash water is sprinkled over the pulp web through sprinkle tubes 28. The washed and dewatered pulp web is brought out of the pressure hood and is taken off the perforated drum by a roller 29. The density of the pulp at this stage is about 8-15 per cent dry content.

The pulp from the top of tower 11, diluted if desired, is fed to this filter through a vented pipe 31, the lower end of which

*Patent attorney, 17600 Pinehurst, Detroit 21.

opens into a container 33, from which the pulp is fed by pump 35 through pipe 37 to the pulp vat 19 of the filter. Air pulled down pipe 31 along with the pulp is released in container 33 under pressure (because of the difference in height between the top and bottom of pipe 31) and joins the air being blown to the hood 21. In some cases, sufficient air is supplied in this way to make it possible to stop the blower altogether.

Most of the white water collected in the filter box 26 goes through a pipe 41 back to the container 33 and is held in circulation in order to dilute the pulp to a density convenient for the operation of the filter. The remainder drains through line 43 and is carried away by pump 44 and pipe 46, thus disposing of the reaction products formed in bleach tower 11.

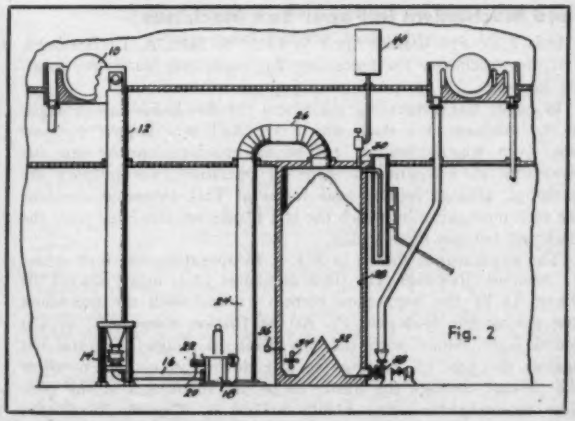
From the filter 15, the pulp drops to a mixer 45, where the chemicals required for bleaching in tower 13 are added. From the end of the mixer 45 the pulp is brought through a pressure lock 47, into conduit 49 and then to a stirring device 51. Steam from a steam pipe 53 is introduced into the stirring device to heat the pulp to the temperature required for the bleaching reaction. The stirring device leads directly to the bottom of tower 13. The upper end of tower 13 is provided with a rotary scraper for discharging bleached pulp.

A pipe 61 for the supply of air under pressure from a compressor tank 63 is connected to the upper end of the conduit 49. A control valve 65, operated by the level of pulp in conduit 49, is inserted in the pipe 61. In this way, an air-filled space 66 is maintained in the upper part of the conduit 49, so that the pockets of the plug 59 of pressure lock 47 are sure to be emptied of their contents when they rotate downwards.

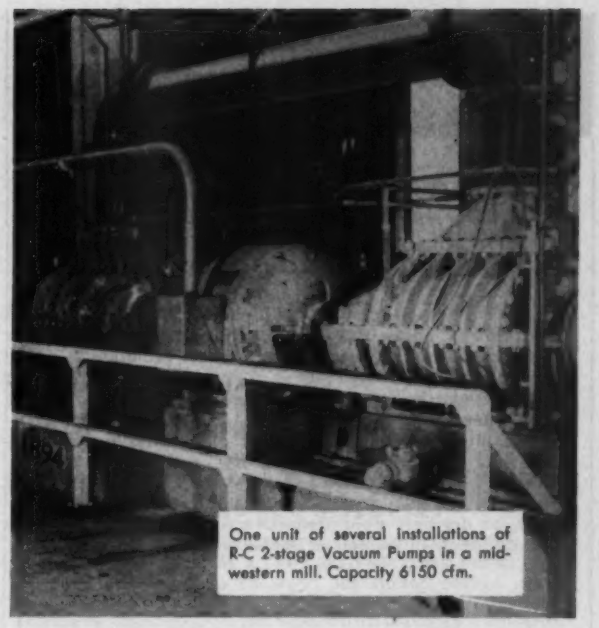
The pressure of the air supplied through pipe 61 is sufficient to overcome the friction in the conduit 49 and the stirring device 51, as well as the lift in tower 13. It is usually 2 or 3 atm. gage pressure. Practically no air accompanies the pulp, as it is drawn off through the pressure lock 47 and back to container 33.

Bleaching with Chlorine Dioxide

U.S. 2,706,673, issued April 19, 1955, to Elmer R. Burling and John P. Rich, describes a method of bleaching wood pulp with chlorine dioxide in solution without breaking the treatment into several stages with caustic washing between the stages.



The method is shown in Fig. 2. A pulp thickener 10 delivers pulp to a compacting tower 12 at a consistency of about 17 per cent air-dried solids. The tower provides a high intake head on the thick stock pump 14. The pump forces the stock through line 16 to a mixer 18. The length and diameter of line 16 are so calculated that the stock in the line forms a plug preventing any back feeding of reagent from the mixer 18. A line 20 supplies a solution of chlorine dioxide in water, and a line 22 supplies steam to the mixer 18 to heat the stock to about 160°F. The dissolved chlorine dioxide is present in a concentration of about 6 grams/liter and has a pH of about 3. The steam and the chlorine dioxide solution dilute the pulp to about 12 per cent air-dried solids. The stock flows from the mixer to the base of a primary reaction column 24 and then to the top of a secondary reaction tower 28. (Continued on page 878)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1% on **dry** fibre weight **effective** (add it to water under agitation in **pulper** or **beater** prior fibre.)

For further details see page 233 of **Paper and Pulp Mill Catalogue, 1955-56 Edition.**

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Patent Reviews . . .

The column of stock in the primary reaction tower 24 provides a static head on the mixer. This should be at least 10 psi. This is of the greatest importance. Chlorine dioxide has an explosive tendency even when mixed with other gases. However, if the partial pressure of the chlorine dioxide does not exceed 10 per cent of the total pressure, the mixture is perfectly safe. Therefore, the most rapid mixing of the chlorine dioxide water with the pulp and water mixture is desirable to reduce as quickly as possible the concentration of chlorine dioxide in water solution and hence to lower its relative vapor pressure.

At the top of the tower 28 a line 30 is used to maintain a constant head. It is essential that this be a positive pressure since, when the stock drops from the line 26 into the tower 28, there is an opportunity for the evolution of unconsumed chlorine dioxide, and the volume at the top of the tower represents a possible zone for explosion. By maintaining a positive pressure at the top of the tower, the partial pressure of chlorine dioxide is reduced.

At the base of the tower are a number of tangentially directed propellers 34 to circulate the stock around the cone 32. One or more inlet pipes 36 serve to dilute the stock with a solution of sulfur dioxide, which neutralizes any residual chlorine dioxide.

Gases (containing air, chlorine dioxide, and water vapor) are bled from the top of reactor 28 through line 30 to a cooler 40, which condenses the moisture, much of the chlorine dioxide dissolving in the condensate. The condensate may be returned to the chlorine dioxide system. The remaining gas may then be discharged to the atmosphere. If necessary, air may be added at the stock pump 14 to provide a constant supply of gas to the bleeder.

As the pulp rises in the primary reaction tower 24, the pressure continually decreases, but as it moves down through the secondary reaction tower 28 the pressure increases. According to the inventor, this overcomes the so-called "barrier effect" and permits virtually complete consumption of the chlorine dioxide.

Feed Mechanism in Paper Box Machines

U.S. 2,705,636, issued April 5, 1955, to Leon A. La Bombard, describes machinery for processing flat paper box blanks for forming boxes.

In paper box processing machinery the flat blanks are brought to the machine in a stack which is placed in a hopper mechanism, from which they are fed to the machine one by one for processing in a continuous series of operations, for instance die stamping, gluing, folding and forming. This invention concerns the feed mechanism by which the box blanks are separated from the stack and fed into the machine.

The apparatus is shown in Fig. 3. In operation, the feed wheel 11 revolves clockwise. The stack of blanks 20 is urged toward the throat 16 by the hopper mechanism 21 and with the top blank 20a against the feed gate 15. As the friction element 12 or 12a comes into contact with the top blank, it drags it to the left against the gate 15, forcing the gate down just enough to allow the passage through the throat 16 of one blank, but at the same time retaining the other blanks behind it. The top blank 20a continues to the left and across the follower roll 30 and over onto the conveyor belt 32. The plug 48 against the spring 45 is adjusted so that the gate 15 yields as the top blank is forced through the throat but so that the spring 45 is strong enough to hold the other blanks back against the friction force between the first and second blank. As the trailing edge of the first blank passes the feed gate, the gate snaps back to its original gap, which was adjusted to be slightly less than the thickness of the blank being fed, and holds the second blank back against the slight friction of the smooth surface of the feed wheel between the friction elements 12 and 12a and until the next friction element engages the second blank which is now the first blank on top of the stack. The oscillation of the presser shoe 24 by the oscillating shaft 60 is timed so that it moves up to force the end of the stack 20 and therefore top blank 20a against the feed wheel just as one of the friction inserts engages the top blank, thereby increasing the fric-

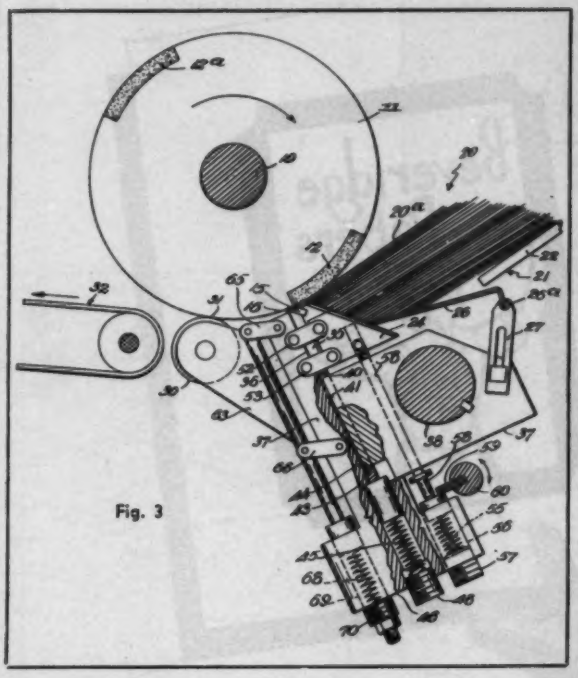

Fig. 3

tional force on the blank when required at the start of the feeding operation. The presser shoe 24 moves down relieving pressure and frictional forces between the wheel and the top blank and also between the blanks behind the top or end blank, except when one of the frictional elements is actually engaging a blank in a feeding operation. The presser shoe 24 and its follower plate 26 have the effect of increasing the efficiency and positive operation of the feed wheel 11 and the yielding feed gate 15.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Apparatus for increasing the consistency of fibrous solutions	Brown Co.	2,713,291	7/19/55
Pulpwood soaking device	Bjorn Sucksdorff	2,713,346	"
Wrap-around-type folding box construction	National Folding Box Corp.	2,713,450-3	"
Easy opening container	The Patent and Licensing Corp.	2,713,454	"
Carton carrier	Edio Inc.	2,713,508	"
Corrugated cartons	Carolina Container Co.	2,713,961	7/26/55
Reinforced container carton	O. B. Andrews	2,713,962	"
Battery container	Gaylord Container Corp.	2,713,964	"
Paperboard container with interlocking flap closure	Container Corp. of America	2,713,965	"
Display stand	Richard E. Paige	2,713,984	"
Doctor means for drying cylinders and calender rolls in paper	Aktiebolaget Kafab	2,714,219	8/2/55
Corrugated paper machine	Packaging Materials Corp.	2,714,340	"
Method and apparatus for volume and consistency control for papermaking stock	Ernest A. Poirer	2,714,341	"
Suction roll	Beloit Iron Works	2,714,342	"
Machines for making corrugated paperboard	Molins Machine Co. Ltd.	2,714,415	"
Shipping container for live chicks	Fort Wayne Corrugated Paper Co.	2,714,482	"
Hollow walled folding boxes	Beljak Corp.	2,714,483	"
Insulating sleeve for dryer bearings	Beloit Iron Works	2,714,538	"
Apparatus for extracting water from paper stock	Jacob Mazer	2,714,839	8/9/55
Calender apparatus	The Traveler's Insurance Co.	2,714,840	"
Laminated paper package	The Specialty Papers Co.	2,714,952	"
Dispenser for wood pulp	Bjorn Sucksdorff	2,714,976	"
Shock-proof carton	The Wilkata Folding Box Co.	2,714,981	"
Container handle and closure	Gaylord Container Corp.	2,714,982	"
Gusseted bags of the valve type	Potdevin Machine Co.	2,714,983	"
Method of coating paper with thermoplastic resins	Provincial Paper Ltd.	2,715,088	"

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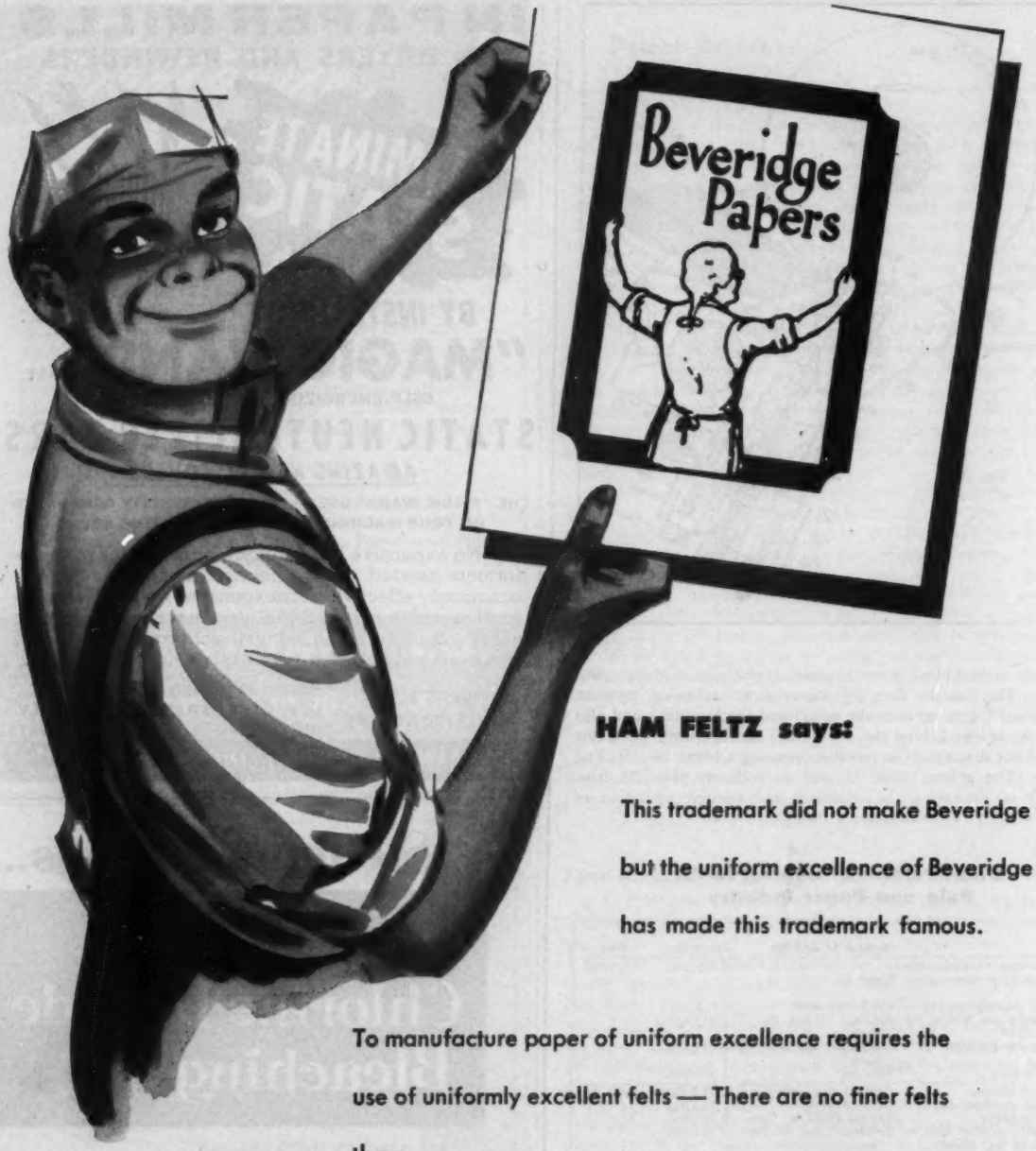

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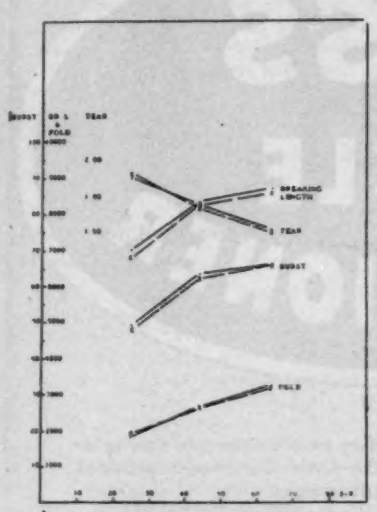
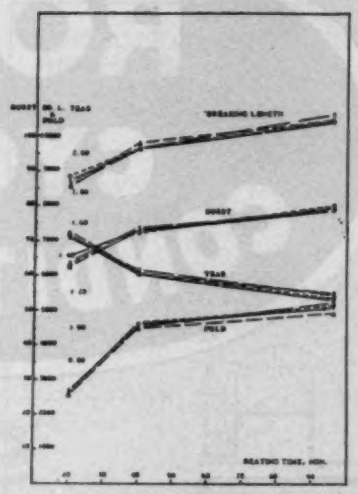
FOREIGN ABSTRACTS



The influence of different methods of drying on the strength properties of the test sheets.
Unbleached Sulphite pulp beaten in the *Valley-beater*
Ordinary drum drying, 2 hours
Drying with one blotter in a hot drum for 40 minutes

Fig. 1



The influence of the conditioning time on the strength properties of the test sheets.
Unbleached sulphite pulp
Conditioning at 65 % R.H. for half an hour,
" " 65 " " 1 hour
" " 65 " " 2 hours
" " 65 " " 4 "

Fig. 2

Rapid drying and conditioning of pulp test sheets

The method devised by the Finnish Central Laboratory for making pulp test sheets and for their subsequent drying and conditioning has shown itself to be too slow as a control method in certain mills. The present work seeks to expedite the drying and the conditioning of such test sheets. Three different pulps (unbleached sulfite, bleached sulfite and unbleached kraft) were used.

Experiments showed that the drying time of test sheets made in accordance with Method A 1 011 of the Central Laboratory of Helsinki could be reduced from two hours to about 40-50 minutes without any appreciable changes in the strength values, provided one blotter is removed from the test sheet before drying in a hot drum. However this should not be the blotter by means of which the sheet was couched from the wire.

Furthermore it was found that the conditioning time for such test sheets could be reduced from 4 hours to ½ hour, at 65 per cent relative humidity, without change in the results of the usual tests. Thus the total testing time, including a 60-minute beating period, sheet formation, drying, conditioning, and strength testing would be about three hours.

This abbreviated testing method may be used only for rapid running control of the production of a pulp mill, and should not be used regularly to replace Method 1 011 in testing for pulp strength, since the latter is more reliable than is its modification. Fig. 1 shows the influence of different drying methods of strength properties of unbleached sulfite pulp. Fig. 2 shows the influence of conditioning time on strength properties of this pulp. Torsten Ekstam. *Paper and Timber* (*Finland*) 37, 265-272 (1955) (In English).

Modern methods for supplying water to the pulp industry

Because the water requirements of the pulp and paper industry are enormous and since demands are also made on the quality of the water, special purification methods may become necessary. Often Northern water-courses in Sweden are subject to sudden changes in color and turbidity, thus giving rise to serious problems in manufacture. The present author stresses the importance of making careful surveys when new water supplies are required and when purification plants are designed. The common purification techniques are discussed, with regard to straining, filtration and chemical purification of the water. Subjects that are dealt with in more detail are: microstrainers, steps to increase the efficiency of sedimentation plants, and the use of chemicals to induce coagulation. Gusta Winqvist. *Norsk Skogindustri* 9, 314-320 (1955) (Original in Swedish, with English summary).

Straw pulps made by the kraft, bisulfite and monosulfite processes

The authors discuss briefly the chemistry of wheat and rice straws in comparison with that of sprucewood, and give the results of various cooks made in Hungary with the two straws. Special attention was given to the effects of liquor composition and of temperature, and in the kraft cooks maximum temperatures of 100°, 140°, and 170°C were used, with cooking chemicals representing 15 per cent of the weight of the straw and a sulfidity of 15 per cent. Removal of the lignin was a function of the temperature, but was practically complete at the end of one hour. On the other hand, the removal of carbohydrates continued with time, and graphs indicate that when the digestion was extended beyond one hour at 140°, or about 0.5 hours at 170°, some cellulose was also lost.

The spent liquors from these cooks were examined for ultraviolet absorption, and these results are discussed. Evidently the spectra showed some differences from those of the "native" straw lignin extracted from wheat straw by doxane. When the authors discuss the action of neutral sodium sulfite on wheat straw, reference is made to "degree of sulfitation" ("Su.") This appears to be the ratio between sulfur dioxide and sodium oxide in the cooking liquors; (SO_2 : Na_2O). Digestions made for 2 hours at 170° in which the Su was varied. These showed that the removal of lignin rose from an initial Su = O (*i.e.* a plain soda cook) to about Su = 0.7, then dropped to a minimum at Su = 1.5 and rose again at Su = 2.0.

Both the highest cellulose and pentosan losses were noted when sodium sulfite was absent (Su = 0); the lowest were found at Su = 1.5, but they rose again at Su = 2.0. The best conditions for pulping straw were obtained at Su = 0.75.

Rice straw has an extremely high ash content, ranging from about 12.5 to 18.5 per cent, and much of this is due to silica. For this reason the neutral sulfite cooking schedules for rice straw were different from those for wheat straw, and these differences are discussed at some length. The authors also try to give an empirical formula showing how to make up their sulfite cooking liquors so that they will serve best to delignify various types of cereal plant fibers—with modifications being based on the lignin content and ash content of the initial straws.

In the case of ordinary calcium base sulfite cooks, the effects of the temperature, digestion periods, and total sulfur dioxide in the liquors were studied. They suggest that the cooks should not extend beyond

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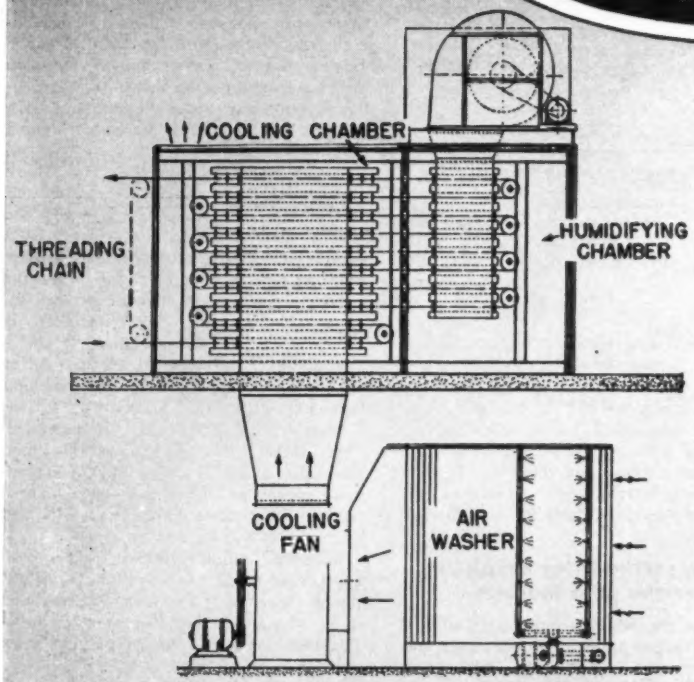

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8 hours and that the digestion temperatures should not exceed 115°C. The total sulfur dioxide should be kept at or below 4.3 per cent.

The mechanism of bisulfite pulping, in which hydrolysis is very important, is discussed from the standpoint of changes in the carbon to sulfur ratio in the lignosulfonates formed under various conditions of the digestion. Sixteen references, 11 graphs, and 1 table are given and special attention is given to the work of M. G. Eliashberg. R. Marton, P. Lengyel and G. Koltai. *Assoc. tech. ind. papetiere, Bull.* 1955, 120-134. (In French).

Studies on the permanence of pulps

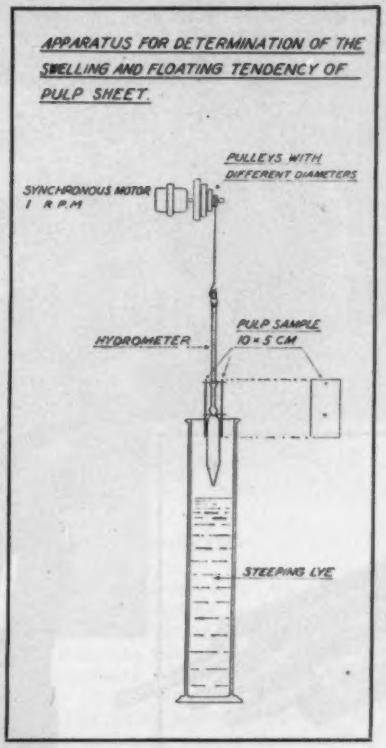
Heating by the Rasch method (cf. *Bureau of Standards J. Research* 7, No. 3, 465-475 (1931)) as an accelerated ageing test was found to be entirely satisfactory when applied to 20 different pulps in a comprehensive study on durability. The pulps included rag stock, coniferous sulfite and kraft pulps, and hardwood and straw pulps. An important criterion on the effects of ageing is the loss of folding endurance, an effect which depends in part on how the stock was beaten.

A number of coniferous kraft pulps were found to have durabilities quite comparable with those of good rag pulps, especially when the kraft pulps had been bleached by chlorine dioxide. On ageing, cellulose decomposition (as gaged by viscosity changes) was also correlated with losses in folding endurance, but these changes in viscosity, taken alone, do not furnish a measure of the durability of the pulp. Yellowing of the sheet on heating seems to be due to a slow oxidation which is correlated with the percentage of the hemicelluloses present in the pulp, but this hemicellulose content is not correlated with viscosity changes.

There appears to be a fair relationship between folding endurance and hemicellulose content. The degree to which yellowing takes place depends on the time of artificial ageing and on the temperature of the oven in which the pulp is heated. None of the above criteria can be used singly in actually judging the permanence of a pulp sheet. G. van Nederveen and A. H. H. van Royen. *Assoc. tech. ind. papetiere, Bull.* 1955, 160-166 (In French).

Determination of carboxyl groups in cellulose

After reviewing briefly other techniques, the authors propose a method which modifies slightly the techniques originally published by Neale and Stringfellow (*Trans. Faraday Soc.* 33, 881 (1937)). The method is only applicable for celluloses having no appreciable reducing (carbonyl) groups and is recommended especially for cottons subjected to alkaline cooking. The determination, which is described in meticulous detail, depends on the addition of excess alkali to the cellulose followed by a suitable back titration. The new method always gave results higher than those obtained by the Neale-Stringfellow method, or by that proposed by Wilson (*Svensk Papperstidn.* 51, 45 (1948)). Ten references, two figures and two tables are included. Olof Samuelson and Axel Wennerblom. *Svensk Papperstidn.* 58, 713-716 (1955).


APPARATUS FOR DETERMINATION OF THE SWELLING AND FLOATING TENDENCY OF PULP SHEET.
PULLEYS WITH DIFFERENT DIAMETERS
SYNCHRONOUS MOTOR 1 R.P.M
HYDROMETER
PULP SAMPLE 10 × 5 CM
STEEPING LYE

Swelling and floating tendency of pulp sheets

This is a revision of a former method, and has been issued as CCA 25:55 by the Swedish Association of Pulp and Paper Engineers, through the Analysis Committee of the Central Laboratory of the Cellulose Industry. The equipment is shown in the accompanying sketch.

Two sample sheets to be tested are weighed to the nearest 10 milligrams and fixed to the hygrometer, which is suspended by a thin wire and attached to a pulley operated by motor. The hygrometer may thus be lowered into the lye (*i.e.* 18 per cent caustic soda) at a predetermined speed. When the pulp sheets have been immersed completely, the hygrometer is uncoupled from its hook, and a reading is taken 2 min. after immersion. Immediately thereafter, the sheets are removed from the hygrometer, placed horizontally on a stainless steel wire net, allowed to drain 2 min. and then weighed on a tared glass plate.

A reading is then taken of the unloaded hygrometer in the *original* lye. During the immersion of the sheets, the difference between the level in the sheet and the free liquid meniscus is measured by means of a millimeter scale (with which the 2-liter measuring cylinder, containing the lye, is equipped). This difference is termed the "dynamic capillary rise." The reading should be taken after equilibrium has been established between the immersion rate and the capillary rate.

Details are given for the calculation of the specific swelling volume and the floating tendency of the pulp. The former is the volume of the swollen pulp corresponding to 1 gram of oven-dried pulp. The latter is expressed as a force in grams per kilogram of oven-dry pulp, and describes the tendency of the pulp sheet to float (or sink) in the press during the steeping period with alkali (in the formation of viscose). Anon. *Svensk Papperstidn.* 58, 626-627 (1955) (in English).

Biological oxygen demand of sulfite spent liquors

The so-called "population equivalent" (P.E.) that has been used in characterizing polluted waterways, while important, cannot be taken alone as a measure of such pollution [This P.E. is based on the assumption that the average waste products resulting from the life of one human individual require a daily oxygen consumption (B.O.D.) of 0.167 lbs. This has been extended to mill wastes, the oxygen demands of which are thus given in terms of a human population, which is simply a calculated value. A P.E. of "6000" would thus refer to a biological oxygen demand of 1000 lbs.]

This P.E. is only one of the many factors in measuring pollution. Inasmuch as various values have been given in the literature for the P.E. resulting from the spent liquors of sulfite mills, per ton of sulfite pulp, these values have been redetermined in cooperative studies.

For spruce sulfite spent liquor, the average P.E. was 3500 per ton of pulp. For beech sulfite spent liquor it was about 8500. When these liquors were sprayed, their population equivalents could be reduced by about 25 to 30 per cent. After fermentation, a further reduction was also effected. Fritz Meinck, *Das Papier* 9, 327-332 (1955) (in German).

Differentiation of wet-strength papers

The author furnishes a rapid method for differentiating between wet-strength papers treated with urea resins and those treated with melamine resins. The papers are immersed in a hot aqueous solution of picric acid and then washed under running water. Papers containing the melamine resin are dyed a brilliant yellow, whereas those containing the urea resins develop only a slight (rather uncertain) yellow tinge. A scheme is given for identifying a number of common wet-strength papers. Such papers include vegetable parchment, papers treated with casein or gelatin and then insolubilized with formaldehyde, those treated with polyethylene-imine resins and papers containing urea-and melamine formaldehyde resins. Guerrando Poles. *Industria carta* (Milan) 9, No. 1, 1-5 (1955) (Original in Italian) [through *Bull. Inst. Paper Chem.* 26, 54 (1955)].

WELDCO ROLLS

. . . Help Produce Top-Quality Paper and Paperboard in new Virginia Paper Plant

The new Paper Machine shown above, produces paper of top-quality and uniformity, and represents the latest in modern paper-making equipment. Since great stress was placed on the newest, most efficient equipment for the company's modernization program, WELDCO Stainless Steel Roll Covers were chosen for the rolls in the Fourdrinier-type paper-making unit.

WELDCO-Covered Rolls are used in many other mills, too, because they offer maximum corrosion-resistance, reduce friction, have superior wettability, increase felt life, and lessen wear on fourdrinier wires. Their smooth, highly-polished surface won't chip, peel, crack or blister — gives many years of economical service, with very little maintenance.

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Both new and old rolls can be covered with Stainless Steel, Monel, Nickel, Inconel, or other alloys, through the patented WELDCO "Pressure Welding" process. For your next machine—new or reconditioned—be sure to specify WELDCO Rolls. Ask your paper machinery builder about them, or contact us direct.

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NEW PRODUCTS

Stainless steel jackets for jordan plugs

Longer life for costly jordan plugs is insured through the use of acid-resisting stainless steel jackets.

The heavy stainless jacket is pre-formed to fit any size jordan plug, completely enclosing the plug body. Additional plates cover exposed ends of the knives and woods.

The jackets have been tested on jordan plugs on all types of paper and in a variety of makes and sizes of jordans. The new method also incorporates Bolton's bandless plug principle to permit interchangeable knives for any type of stock. *Emerson Mfg. Co. Div. of John W. Bolton & Sons Inc., Lawrence, Mass.*

Dual sensitivity voltmeter

A new instrument, designated as the Hayward Model 610 dual sensitivity voltmeter, designed for measuring the structure-to-soil potential needed in corrosion control and cathodic protection work, consists essentially of a special voltmeter movement having two different sensitivities. DC voltage ranges of 0-0.2/1/2/10/20/100 are provided, as well as a "short" position to short circuit the movement when carrying the instrument. No tubes or batteries are required.

This meter can also be used to measure structure-to-structure potential and voltage drop in the soil itself. The higher voltage ranges make the instrument suitable for conventional voltage measurements such as the output voltage of rectifiers, etc.

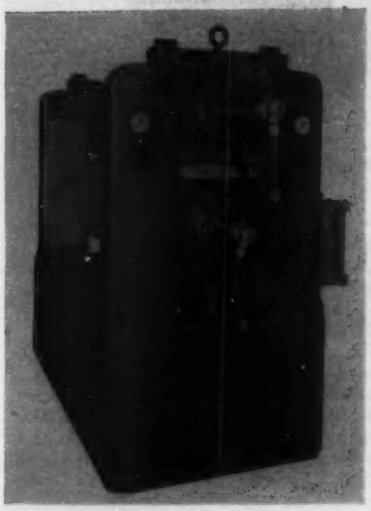
The instrument weighs only 2½ lbs., measures 6 ¾ x 5 ¼ in. and is portable. A carrying case is included. *Associated Research, Inc.*, 3758 *W. Belmont Ave., Chicago* 18, *Ill.*

Coating and laminating section

A versatile new standard design coater provides economical basic units on which coating and laminating machines for various operations can be built. Six different coating methods can be provided within one framework.

The frames are designed so that it is possible to add idler rolls, wire-wound metering bars, oscillating doctors, smoothing rolls and other auxiliaries as required. Rolls can be furnished bored for hot melt applications. The coater is also readily adaptable as additional equipment.

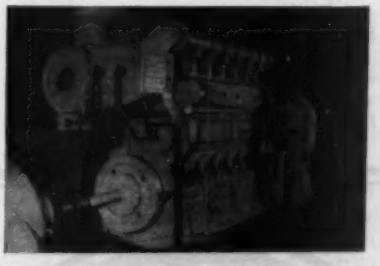
This new two-roll press-section is suitable for moderate duty and widths at speeds up to approximately 600 fpm. *The Black-Clawson Co., Dilts Machine Works Div., Fulton, N.Y.*



Heavy-duty embosser

Recently introduced is a new heavy-duty embossing machine capable of pressures up to 1500 lb. per lineal inch.

An interesting feature of the machine is the air-hydraulic booster system for loading the rolls, which is contained in the base. Large access panels are provided in order to service the loading system easily, and the new machine also features individual pressure regulation for the front drive side. *The Black-Clawson Co., Dilts Div., Fulton, N. Y.*



Heavy duty engines

A new design in moderate speed, 4-cycle, heavy-duty diesel, dual fuel, and gas engines with ratings up to 1400 hp has been announced. These new medium speed engines are designed for such applications as sewage disposal plants, chemicals and petroleum, pump or blower drive, and mobile power.

This new W 9 line has Jet-Swirl turbocharged power and has a streamlined design for air inlet which brings the air in parallel to the inlet valve stem and gives it a swirl as it enters the cylinder. It is claimed this new feature allows ramming larger and more turbulent air charges into the cylinder, giving cleaner and more complete combustion.

Designed throughout for high pressure turbocharging, this engine is capable of outputs up to 1400 hp at 1000 rpm, according to the manufacturer, and is structurally designed for operation at higher than 200 psi, bmep.

Precision type oversized bearings on main, crankpin, wrist pin, and cam shafts reduce bearing pressures. Patented features include dual plunger fuel pumps, automatic thermal air control, micro-metering gas valves and self-aligning exhaust valve seat inserts for optimum economical performance. *Worthington Corp., Harrison, N.J.*

Truck-cranes

Five new truck-crane models, ranging from 12½- to 35-ton lifting capacity, are now being offered. Their manufacturer has named the new models "Zephyrcranes" because of claimed speed in moving from job to job. Said to offer contractors, industry and municipalities new highs in lifting and digging efficiency, all five models feature "Speed-o-matic" power hydraulic control. By giving the operator ability to control all working operations easily and quickly, this is said to increase output up to 25 per cent or more.

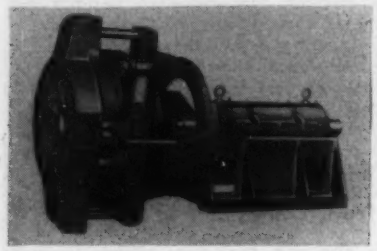
Zephyrcranes are said to deliver ample net horsepower or actual line pull for all operations. The manufacturer claims that this greater "net" horsepower, plus more live weight, allows the machines to handle more work in less time, with lower overall cost for maintenance and service.

The new models have power hydraulic-operated clutches, self-compensating for heat and normal lining wear. Fully convertible to standard front-end attachments and available with torque converter power units, all are mounted on specially-designed carriers, with full-floating walking beam rear axle supports that allow travel over uneven terrain. Screw-type outrigger jacks, pontoons and removable rear outriggers are also available. Speed-o-matic reversing clutches, available on all models as an extra, permit power-controlled load lowering of main hoist line and jib whip line.

The two smaller Zephyrcranes (12½- and 17½-ton capacity at 10-ft. radius) are designed for all-purpose lifting and digging. Both are fully convertible and are said to meet highway weight regulations in most localities.

The larger models (25-, 30- and 35-ton capacity at 10-ft. radius) are primarily erection rigs, giving their owners, it is claimed, greater lifting capacity plus the

inherent advantages of working at greater radii by being able to use long booms and jibs. All three models, available with a third drum for piledriving operations, are also designed for easy convertibility to other front-end attachments. Clutches on each model, with the exception of the third drum clutch, are fully interchangeable, and a hydraulically controlled swing brake is standard equipment. The three larger models feature the independent rapid boomhoist and patented retractable high gantry as standard equipment. The manufacturer has provided a counterweight removal device using Speed-o-matic hydraulic jacks which he claims speed "stripping" surplus weight to meet highway travel regulations and also to facilitate addition of the counterweight at the job site. *Link-Belt Speeder Corp., 307 N. Michigan Ave., Chicago 1, Ill.*

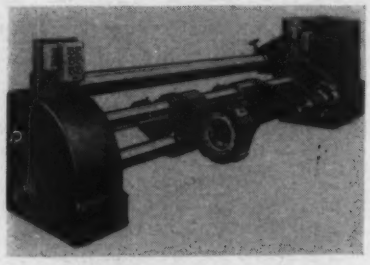


Slurry pump

Designed to handle abrasive slurries of cement, sand, coal, solids, chemical sludges and plant wastes up to the maximum of fluid consistency under suction lift of positive head, a new low-speed, continuous-duty pump is now available in seven models, from 2- to 6-in. size.

The manufacturer states that, among the features of this pump, the stuffing box is subject to suction pressure only; the wearing parts can be reached without disturbing the piping, and the rotating element is adjustable to take up for any wear. Additionally, the liners on both sides of the impeller are renewable. It is pointed out that heavy outboard radial bearing provides extra capacity for high, over-hung loads, and the suction and discharge nozzles swivel to meet the requirements of any installation. *Morris Machine Works, Baldwinsville, N.Y.*

New Products . . . . . .



Shaftless backstand

Designed for unwinding heavy rolls at high tensions and fast speeds, a new shaftless backstand has been introduced to facilitate roll handling on slitter-rewinders and other converting machinery.

The manufacturer states that the new backstand has been ruggedly constructed for operation at 1500 fpm with rolls of up to 3500 lb. and 42 in. diameter. It is claimed that web tensions up to 10 lb. per lineal inch can be reached. Rolls are easily lifted from floor to running position, it is pointed out, by simple push-button control. Chucking of rolls is also accomplished by simple push-button control at the operator station. Chucks shown in the accompanying illustration are for iron pipe cores, but the new backstand is also available with ribbed chucks for 3- to 6-in. inside diameter paper cores. *The Black-Clawson Co, Dilts Machine Works Div., Fulton, N. Y.*

Chemical counter-active oxidant

A new chemical counter-active oxidant has been developed which eliminates, by chemical means, odors in crude sulfate turpentine that are traceable to organic sulfur compounds.

Application is made in a two-stage reaction, using .01 per cent of both products. In some cases air can be substituted if immediate chemical reaction is not needed, in which case the concentration required would be .001 per cent. *Rhodia Inc., 230 Park Ave., New York 17, N.Y.*

Bronze solder-end valves

A new line of five bronze solder-end valves is designed with plain ends for use with types K, L and M copper tubing. Secure connections are made by a simple soldering operation, and the installation assures smooth full flow and compact assembly. These solder-end valves embody exclusive features such as the "Non-slip" handwheel, long-wearing "Stemalloy" stem, hexagon head gland, back seats permitting repacking under pressure, leak-resistant extra deep stuffing box and corrosion resistant close-grained bronze.

There are three gate valves: rising stem with double-wedge disc, rising stem with solid-wedge disc and non-rising stem with single-wedge disc. All three are rated at 125 lb. steam and 200 lb. water, oil and gas.

A bronze swing check valve with renewable disc and side plugs carries the same pressure ratings, and a non-metallic-disc globe valve is rated at 150 lb. steam and 300 lb. water, oil and gas. *Lunkenheimer Co., P.O. Box 360, Cincinnati 14, Ohio.*

Spray valve panels

New spray panels are designed to spray-lubricate bull gears, girth gears such as on grinding mills and kilns and other spur or herringbone gear trains. These self-contained panels are fastened to gear hous-

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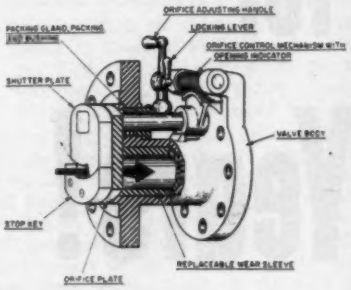
ings or framework and spray the lubricant directly to the pressure side of the gear teeth.

Measuring approximately 2 by 3 ft., the panels have stainless steel spray valves with built-in nozzles. Central pumping units deliver gear lubricant at regular intervals through a circuit of Dualine measuring valves. The measuring valves distribute the lubricant under pressure to the spray valves, where it is mixed with air to form a penetrating spray. *Farval Corp., 3249 E. 80th St., Cleveland 4, Ohio.*



Discharge valve

A digester blow valve, which features micrometer control of the orifice opening, has recently been developed. Designed primarily to operate in conjunction with the Pandia continuous discharger, this new all-stainless steel valve is applicable to any process where it is necessary to discharge the stock from a high-pressure digestion zone to atmosphere.

The area of the discharge orifice is said to accurately and quickly adjust by means of a worm gear and quadrant arrangement with a locking lever mechanism to maintain positive setting of the shutter plate. An orifice opening indicator facilitates accurate resetting of the shutter plate.

According to the manufacturer, this valve is precision built with a minimum of moving parts. The only portion of this unit subject to appreciable wear is a readily replaceable wear sleeve, immediately following the adjustment valve opening. *Black-Clawson Co., Shartle Bros. Mach. Div., 250 Park Ave., New York, N. Y.*

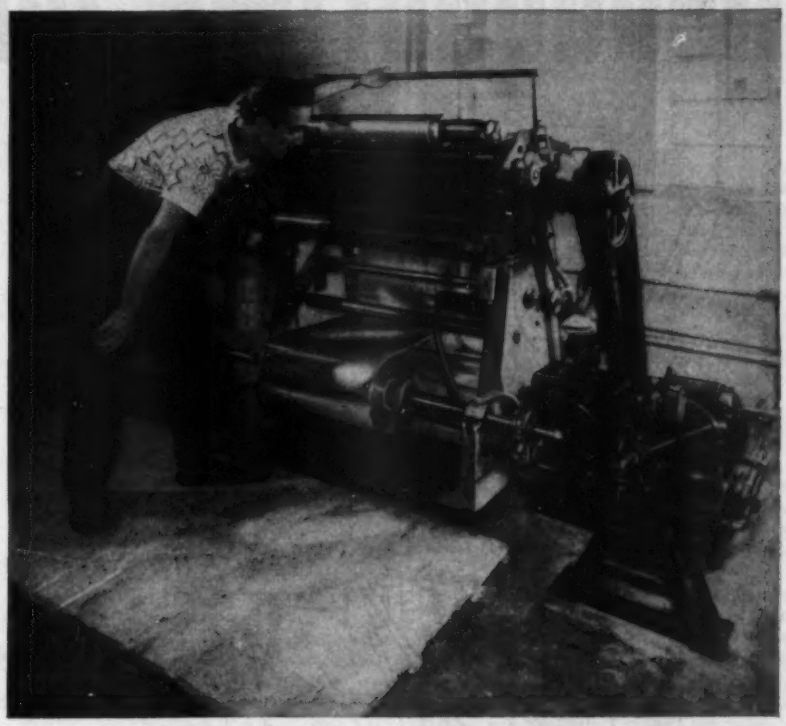
Unitary mechanical seals

A new series of unitary mechanical seals is designed for use on rotary shafts of boiler feed pumps, chemical pumps, oil refinery pumps digester circulating pumps and other process pumps.

These new seals have a number of distinctive features. The entire unit, including sleeve and gland, is self contained, ready for quick assembly. Pre-set at the factory, the seals require no on-the-job measurements. A Collett-type drive eliminates loosened set screws and corrosion or damage to shaft and shaft sleeve.

External lock and drive is readily accessible, and circulating connections in glands provide cool, clean lubrication to lengthen life of the seal. All sealing faces are precision lapped and all high-pressure seals are pressure balanced. *Garlock Packing Co., Palmyra, N.Y.*

SLITTING PRETTY at Transparent Paper Products Co., Ltd.



Askania Edge Position Controls Cut Payroll Costs 1/3—Increase Production 100%

"These Askania controls—they're magnifique!" says Mr. Claud Hebert, President of Transparent Paper Products Co., Ltd., Montreal, Canada.

"By installing Askania edge position controls on our two Beck slitting machines we have been able to cut slitter operation from 3 shifts to 2—and still double slitter production."

Here's what Askania controls did for Mr. Hebert's company:

ELIMINATED TRIM WASTE. It was formerly necessary to trim ¼ inch from both edges of each roll after slitting. Six months of operation with Askania controls produced no trim waste at all.

PERMITTED FASTER MACHINE SPEED. The slitters now run at 600 ft. per minute. Before adding Askania controls, they were run at 230 ft. per minute so the slitter operator could watch the web and adjust the roll by hand.

IMPROVED EDGE TOLERANCE. Precision tolerances at Transparent Paper Products Co., Ltd., are now better than $\frac{1}{16}$ of an inch. Before installing Askania controls they used to vary as much as ½ inch.

* * *

NOTHING TOUCHES THE WEB BUT A BREATH OF AIR

A stream of low pressure air passes across the edge of the web to measure and transmit the signal.

If you have a web-guiding problem it will pay you to investigate the advantages of Askania controls. Write for Bulletin No. 161.

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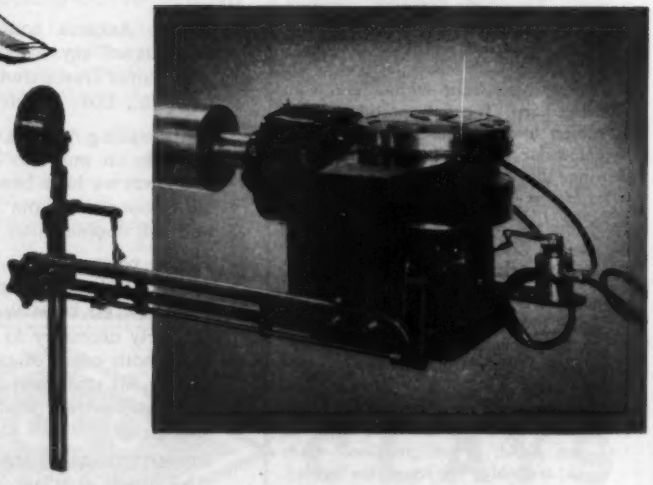

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Books

ORGANIC CHEMISTRY SIMPLIFIED. Author, Rudolph Macy, Ph.D. Published by Chemical Publishing Co. Inc., 212 Fifth Ave., New York 10, N. Y. 620 pages. 8¾ x 5¾. $12.00. Second Edition. Revised and enlarged.

Aimed to give the reader a broad concept of the subject rather than to convert his mind into an encyclopedia by memorizing all name reactions, experimental reaction conditions, and properties of many series of compounds, this book emphasizes the development of the structures of the various types of compounds on the basis of the electron theory.

The explanations are so complete that the book can be used as a self-teaching manual. Much space is given to modern theory as the basis of chemical thinking. Over 120 line drawings and photographs of molecular models contribute to the clarity of presentation.

The book is divided into four sections, those being: The Unique Position of the Carbon Atom in Chemistry, The architecture of Carbon Compounds, The Classification of Carbon Compounds, and Special Topics in Organic Chemistry.

FORESTRY HANDBOOK. Edited by R. D. Forbes for the Society of American Foresters with Arthur B. Meyer, Staff Editor. Published by The Ronald Press Co., 15 E. 26th St., New York 10, N.Y. 1200 pages. 9¼ x 6¼. $15.00.

Prepared as a working reference, this handbook is organized into 23 indexed sections to give, in one convenient volume, the facts, techniques, and working methods of modern forestry as it is practiced in the United States and Canada.

Drawing from literature on forestry and important related fields, the Forestry Handbook presents the measurement data, converting factors, formulas, experience-tested practices and related information needed to solve day-to-day technical and administrative problems or to form the basis for sound long-range policy formation.

In addition to sections dealing with subject matter basic to forest measurment, usage, development, and protection are the sections on range management, watershed management, surveying, forest road engineering, communications, geology, and many other subjects of importance to all who have a professional, commercial, or academic interest in forest lands. Included are 300 charts, graphs, drawings, cuts, and photographs to aid in easier comprehension while facts and data can be found quickly in the more than 400 tables into which they have been organized.

PROBLEMS AND CONTROL OF AIR-POLLUTION. Edited by Frederick S. Mallette. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 9¼ x 6. 272 pages. $7.50.

Presented in this new book are the proceedings of the First International Congress on Air-Pollution held in March, 1955, under the sponsorship of The American Society of Mechanical Engineers. The authors whose papers appear in this work are among the world's foremost authorities in the field of air-pollution control.

This book will prove of immense interest and value to everyone concerned with reducing or eliminating air contamination. According to the publisher, no effort has been spared to include the newest, most authoritative material available. This is particularly true of the chapters on the treatment and recovery of sulfur dioxide — widely recognized as one of the most formidable challenges to effective air-pollution control.

Included in this book are sections on Gaps in the Available Knowledge On Air Pollution, Current Developments in Air Pollution, Sulfur Dioxide — Treatment and Recovery, and Experience in Air Pollution Abroad. Management and technical personnel concerned with the control of sulfur gases from the burning of fuels or from processing operations, civic groups, municipal officials, and those concerned with the medical, biological and meteorological aspects of air-pollution will gain many helpful ideas from the different sections contained in this book.

Booklets and Pamphlets

TREE GRADES AND ECONOMIC MATURITY FOR SOME APPALACHIAN HARDWOODS (Station Paper No. 53). By Robert A. Campbell Published by Southeastern Forest Experiment Station, Asheville, N. C. 8 x 10½. 22 pages. This report is a revision and enlargement of an earlier station paper (No. 3) proposing a tree grading system designed to separate Appalachian hardwood trees into appropriate value classes. The development of hardwood tree grading is traced from its origin in the Lake States to

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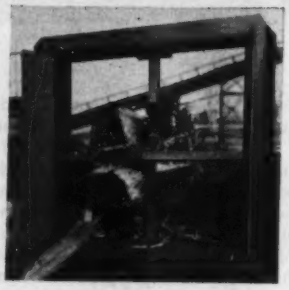

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its present stage of refinement in the Appalachians. The author's contribution of synthesizing grade yields, and quality index value for whole trees from those of graded butt and upper logs is also summarized. Many tables, graphs, and photographs are included. Basic tables given in the appendix can be used for computing new tree and stumpage values for any given location or change in lumber values.

POSSIBILITIES FOR EXPANDING THE MARKET FOR SUGAR CANE BAGASSE. Published by the U. S. Department of Agriculture. (Order Marketing Research Report No. 95 from the Marketing Information Div., Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C.) This report evaluates the possibilities of further expanding the market for present and possible bagasse products; pulp, paper, paperboard, insulation board, hardboard, furfural, poultry litter and mulch. Depithed bagasse makes an excellent corrugating medium and relatively good greaseproof and glassine papers. Bagasse pulp is a desirable supplement to woodpulp in making fine papers and can be substituted for varying percentages of woodpulp in making wrapping, bag, newsprint and magazine papers.

PRINCIPLES OF CHLORINE GAS FEEDERS. (Ref. No. 840-L29) by R. W. Pearce. Reprinted by Builders-Providence, Inc., 345 Harris Ave., Providence, R. I. 8½ x 11. 12 pages. Reprinted from *Water and Sewage Works* magazine, this bulletin contains special reference to applications of chlorine in the treatment of industrial waste, in addition to basic chlorine feeder information. Numerous photographs, diagrams, tables, and flow sheets illustrate this article, which covers such subjects as handling chlorine, dissolving chlorine, withdrawing gas from containers, types of feeders, how feeders operate, methods of control, feeder installation, treatment processes, etc.

Manufacturers' Publications

Through the co-operation of manufacturers and supplier, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Gum from Guar seeds. Burtonite Co., Nutley 10, N.J.—A bulletin of technical data on "Burtonite #7" summarizes paper mill run results. The cold water soluble gum requires no cooking, may be added to water or water furnish under agitation in available stock preparation equipment in its dry form. The addition of 0.5 to 1 per cent on dry fiber has reduced refining up to 52.5 per cent where prolonged refining has been essential and to virtual zero on papers needing very little mechanical action. On tissue sheets "Burtonite #7" in the furnish gives greater strength; on book papers the addition of 1 per cent has permitted the reduction of stock refining to virtual zero while maintaining normal strength, filler content and formation; in rag content papers 1 per cent of this gum is more effective than an equal amount of starch; kraft papers gain in strength at 10 per cent faster machine speeds and have excellent high porosity in finished papers. Wet strength can be imparted to formations containing 0.5 to 1 percent "Burtonite #7" by spraying or sizing the sheet with borated water when halfway through the dryer.

Prevention of Occupational Skin Diseases. Association of American Soap & Glycerine Producers Inc., 295 Madison Ave., New York 17, N.Y. — This comprehensive booklet discusses the incidence of occupational dermatoses, the make-up of the skin and its appendages, causes and prevention of occupational skin diseases and skin cleaners. A summary and a glossary of terms is included.

Flexible Mechanical Couplings. Philadelphia Gear Works, Venango & G Sts., Philadelphia, Pa. — A 12-page catalogue describes the new Sphereflex line of curved root, spherical tooth couplings; and provides complete data on installation, service factors, proper selection, specifications and lubrication. Featuring dimensional drawings this new reference booklet tabulates complete dimensions and specifications in size numbers up to 6-in. nominal bore for each type of coupling.

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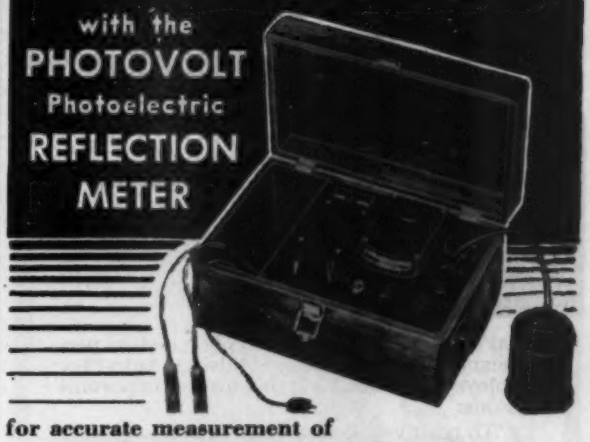

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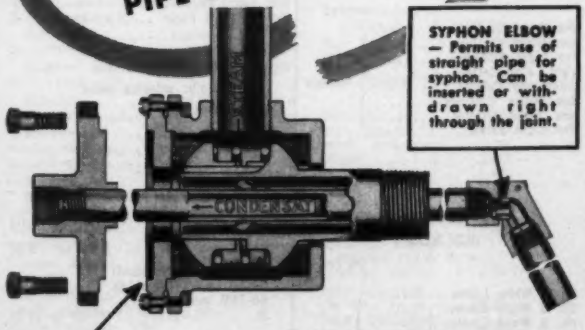
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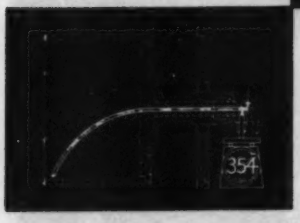

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MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

The following are quotations to mills, f.o.b. New York: per cwt.

No. 1 White Shirt Cuttings	14.50 to 15.50
New Unbleached Muslins	16.50 to 17.00
Fancy Shirt Cuttings	5.50 to 6.00
No. 1 Percales	6.50 to 7.00
No. 1 Washables	3.00 to 3.25
No. 1 Light Silesias	8.00 to 8.50
No. 1 Light Prints	5.50 to 6.00
Light Flannelettes	8.00 to 8.50
Cottonades	3.75 to 4.00
Blue Overalls	8.00 to 8.50
Blue Cheviots	8.00 to 8.50
Canton Flannels, Bleached	11.50 to 12.00
Canton Flannels, Unbleached	11.50 to 12.00
Osnaburg Cuttings	10.00 to 11.00
Underwear Cuttings, Bleached	16.00 to 16.50
Underwear Cuttings, Unbleached	16.00 to 16.50
Khaki Cuttings—	
Sun Tan	6.25 to 6.75
Mixed	3.75 to 4.00
Linen Cuttings—	
American	7.50 to 8.00
White	12.00 to 13.00
Grey	12.00 to 13.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

Roofing	Per cwt.
No. 1	1.55 to 1.65
No. 2	1.45 to 1.50
No. 3 and 4	1.15 to 1.25
Twos and Blues—	
Repacked	2.50 to 2.75
Thirds and Blues—	
Repacked	2.25 to 2.50
Miscellaneous	2.00 to 2.15
Whites, No. 1—	
Repacked	4.00 to 4.25
Miscellaneous	3.25 to 3.50
White, No. 2—	
Repacked	3.00 to 3.25
Miscellaneous	2.50 to 2.75

RAGS (Foreign)

ex dock New York City

NEW RAGS

per cwt. Nominal

- New Dark Cuttings
- New Mixed Cuttings
- New Light Silesias
- Light Flannelettes
- Unbleached Cuttings
- New White Cuttings
- New Light Oxfords
- New Light Prints

RAGS (Foreign)

ex dock New York City

OLD RAGS

per cwt. Nominal

- No. 1 White Linens
- No. 2 White Linens
- No. 3 White Linens
- No. 4 White Linens
- No. 1 White Cottons
- No. 2 White Cottons
- No. 3 White Cottons
- No. 4 White Cottons
- Extra Light Prints
- Ord. Light Prints
- Med. Light Prints
- Dutch Blue Cottons
- French Blue Cottons
- French Blue Linens
- Checks and Blues
- Linsey Garments
- Dark Cottons
- Old Shoppers

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	5.50 to 6.00
Domestic	5.50 to 6.00
Wool Tares—	
Light	5.50 to 6.00
Heavy	5.75 to 6.25
No. 1 Scrap Bagging	4.50 to 5.00
Manila Rope—	
No. 1 large, dom.	8.00 to 8.50
No. 1 small	7.00 to 7.50
Sisal Rope—	
No. 1 large	6.00 to 6.50
No. 1 small	5.50 to 6.00
New Burlap Cuttings	5.75 to 6.25
Jute Threads—	
Foreign (Nom.)	6.00 to 6.25
Domestic	6.25 to 6.50
Strings—	
No. 1 sisal	4.75 to 5.00
No. 2 sisal	4.25 to 4.50
Soft jute	4.75 to 5.00
Mixed	2.00 to 2.25

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts	140.00 to 150.00
Hard White No. 1	110.00 to 115.00
Soft White, one-cut	90.00 to 95.00
Soft White, No. 1	75.00 to 80.00
Fly Leaf No. 1	42.50 to 47.50
Fly Leaf, Woody No. 1	45.00 to 50.00
No. 2 Mixed Cal. Woody	30.00 to 35.00
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	28.00 to 30.00
Mixed Books	22.00 to 23.00
Ledger Stock—	
No. 1 White	65.00 to 70.00
No. 1 Mixed (Colored)	42.50 to 47.50
Manilas—	
New Env. Cuttings	75.00 to 80.00
New Cuts, One-Cut—	
Extra Manilas	23.00 to 25.00
Manila Tab Cards, Free of Ground Wood	95.00 to 100.00
Colored Tab Cards	75.00 to 80.00
Kraft—	
New Envelope Cuttings	85.00 to 90.00
Tripled Sorted No. 1 100%	45.00 to 50.00
No. 1 Old Assorted	32.50 to 37.50
News—	
White Blank	75.00 to 80.00
Overissue	29.00—
No. 1 Folded	26.00—
Old Corrugated Containers	24.00—
New Jute Corrugated Cuts	29.00—
Mill Wrappers	24.00—
Box Board Chips	18.00—
No. 1 Mixed Paper	16.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	5.05—
Ground, cwt.	4.30—
Powdered, cwt.	5.10—
Blanc Fixe—	
Pulp, bulk, ton	100.00—
Dry, barrels	105.00—
Bleaching Powder—	
Drums, cwt	5.00 to 6.00
Casein (Domestic Standard) 20-30 mesh (bags), lb. 80-100 mesh (bags), lb.	27.00 to 29.00
Argentine, lb.	25.00 to 25.50
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 13.00
Domestic Coating Bulk (mine) ton	17.00 to 25.00
Imported (ship side) Bulk (lump) ton	20.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	3.05—
Gelatine (silicon), lb.	1.25 to 1.35
Glye. (C.P.) drums, lb.	.29½ to .30
Litharge, Powd. bbl. lb	.17 to .17½

MARKET QUOTATIONS

Resin (Gum)—	**New York, per 100 lbs.**
E	9.55—
F	9.55—
G	9.55—
WW	9.70—
Resin (Wood), carlots, F.O.B. South	6.50—
Salt Cake—	
Dom. bulk (wks) ton	28.00 to 29.00
Imp. bulks on deck—(Atl. ports) ton	
(Nom.)	22.00—
Soda Ash—	
Bulk (works) cwt.	1.45—
Paper bags, cwt.	1.80—
Soda (Caustic)—	
Solid drums, cwt.	4.10 to 4.85
Ground and flake, drums, cwt.	4.50 to 5.25
Sodium Silicate—	
60 deg. 55 gal. drums, (works) cwt.	1.60 to 1.70
40 deg. 35 gal. drums, (works), cwt.	1.35 to 1.40
Starch—	
Pearl, 140 lb. bags, cwt.	7.14—
Pearl, barrels, cwt.	7.14—
Paper (Sq.) bags, cwt.	7.14—
Powdered, barrels, cwt.	7.35—
Sulphur (Crude)	
(Mine) bulk, long ton	26.50 to 28.00
Talc—	
Dom. 100 lb. bags (mine) ton	25.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig, bbls., lb.	.22½ to .23
Calcium Pig, bbls., lb.	.22½ to .23
Zinc Oxide, bags	14.00 to 15.50

WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follows:

Bleached Sulphite	145.00—
Bleached Sulphite, Canadian	150.00—
Unbleached Sulphite	120.00—
Unbleached Sulphite, Canadian	130.00—
Bleached Soda	142.50—
Bleached Soda, Canadian	142.50—
Kraft Bleached	147.00 to 150.00
Kraft, Bleach., Hardwood	145.00—
Kraft, Bleach., Southern	150.00—
Kraft, Bleach., Canadian	150.00—
Kraft, Unbleached, Northern	120.00—
Kraft, Unbleached, Southern	112.50 to 120.00
Kraft, Unbleached, Canadian	125.00—
Kraft, Semi-Bleached, Southern	130.00 to 135.00
Sulphite Screenings	72.50—
Sulphate Screenings	67.50—
Groundwood	80.00 to 85.00

Quotations on imported wood pulp, dollars per short ton, ex dock American Atlantic ports with varying freight allowances, follow:

Bleached Sulphite, Swedish	150.00—
Bleached Sulphite, Norwegian, freight allowed	145.00—
Bleached Sulphite, Finnish, freight allowed	150.00—
Unbleached Sulphite, Swedish	130.00—
Unbleached Sulphite, Finnish, freight allowed	130.00—
Kraft, Unbleached, Swedish, freight allowed	115.00—
Kraft, Unbleached, Finnish, freight allow.	115.00 to 145.00
Kraft, Bleached, Swedish, ex dock	150.00—
Kraft, Bleached, Norwegian	150.00—

PAPER

Quotations are mill quotations New York City

Boards—

Prices per ton, delivered in New York, 10 tons or more:

Plain chip	90.00—
News vat lined chip	95.00—
.009 chip, rolls	95.00—
Filled news	90.00—
Solid news	95.00—
White vat lined chip	125.00—
Chip tube and can stock	100.00—
Single manila lined chip	140.00—
Single jute lined chip	125.00—
Kraft liner	130.00 to 140.00

White patent coated:

.020	155.00—
.018	157.50—
.016	160.00—

Book Paper f.o.b. New York— per cwt.

Machine coated, two sides

70 lb. No. 2 enamel; 25x 4 cases	$17.25
38-500, trimmed 4 sides. Carloads	$16.30
45 lb. enamel, 25x38-500, 4 cases	$13.05
trimmed 4 sides. Carloads	$12.10

Uncoated

55 lb. No. 2 offset, 25x38 4 cases	$14.80
500, trimmed 4 sides. Carloads	$13.85
50 lb. A Grade English Finish, 25x38-500, un 4 cases	$14.05
trimmed Carloads	$13.16
20 lb. envelope, 17x22-500, untrimmed Carloads	$12.40
16 lb. tablet, 17x22-500 Carloads	$11.35

Rag Content Bond—

(White, 5,000 to 10,000 lbs., basis 16 lb.)

100% rag	58.80—
75% rag	45.45—
50% rag	36.20—
25% rag	29.70—

Rag Content Ledger—

(White, 5,000 to 10,000 lbs.)

100% rag	58.80—
75% rag	45.45—
50% rag	36.20—
25% rag	29.70—

Sulphite Bond—

(White, 5,000 to 10,000 lbs., basis 16 lb.)

No. 1	20.10—
No. 2	20.40—
No. 4	17.75—

Sulphite Ledger—

(White, 5,000 to 10,000 lbs.)

No. 1	20.50—
No. 2	19.75—
No. 4	18.15—

News delivered in New York— per ton

Rolls, Standard (Contract)	129.00 to 132.00
Rolls (Spot)	(Nominal)
Sheets	140.00—

Tissues (Carlots) f.o.b. New York— per ream

White No. 1	1.85—
White No. 2	1.45—
Bleached Anti-Tarnish	2.20—
Colored	2.00—
Anti-Tarnish Kraft	1.65—
Manila	2.00—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	1.00—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.	1.00—
Toilet, Bleached (M shts.) per cs.	9.35—
Toilet, Unbleached (M shts.) per cs.	7.90—

Towels f.o.b. New York— per case

Bleached	6.80—
Unbleached	5.90—

Wrappings (Kraft) f.o.b. New York— (Basis 50 lb. & heavier) per cwt.

Standard wrapping	8.25—
Butchers, counter rolls	8.50—
Standard bag, mill rolls	7.75—
Shipping sack, mill rolls	8.00—
Gumming, mill rolls	8.25—
Asphalting, mill rolls	8.00—
Envelope, mill rolls	9.50—

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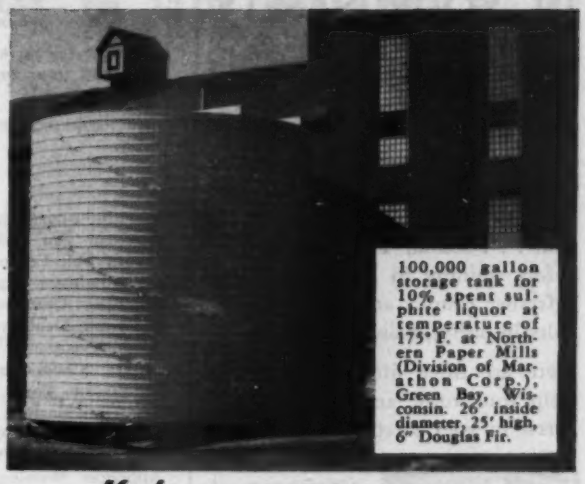

100,000 gallon storage tank for 10% spent sulphite liquor at temperature of 175° F. at Northern Paper Mills (Division of Marathon Corp.), Green Bay, Wisconsin. 26' inside diameter, 25' high, 6" Douglas Fir.

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... quality-built to your specifications

Engineering experience, craftsmanship, selected top-grade tank lumber ... your guarantee of satisfaction. For large tanks or small, see *Kalamazoo* first. Free estimates and suggestions.

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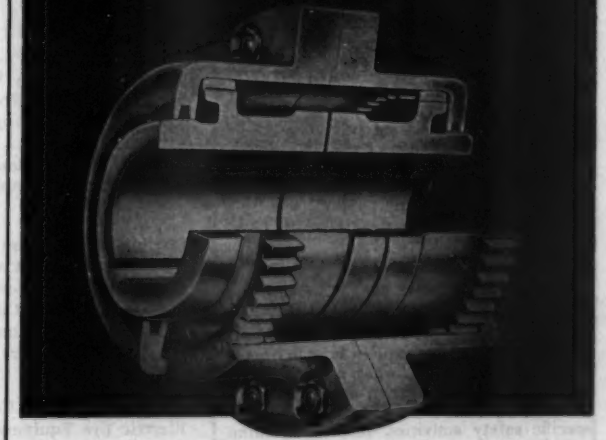

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POOLE FOUNDRY & MACHINE COMPANY

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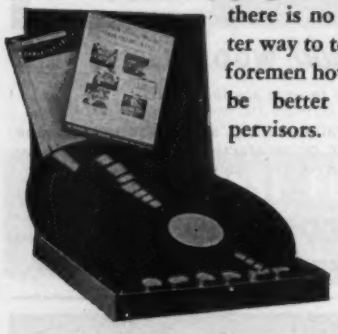
PUT ACTION IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.



SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

Write for complete information and details to the

NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

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Where can you find—quickly—answers to your questions such as . . . . .

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. . . shock pressure caused by water hammer?

. . . friction of stock in iron pipes?

. . . weight of pulpstones?

. . . symptoms of causes of motor troubles and how to remedy them?

. . . volumetric measure of pulp wood?

The answers to these questions and to countless others you'll find in the Engineering Handbook Section of your

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PAPER INDUSTRY

Whither?

. . . in production, processes, new products, markets

New principle in multi-wall bag construction

A new principle in multiwall bag construction which uses structural strips of kraft paper between two walls to reinforce the gusset areas in bags of five and six-ply construction has been successfully developed by St. Regis Paper Co.

A structural strip placed in each gusset of a four-ply or five-ply bag makes such bags comparable in performance to five-ply and six-ply bags respectively. While no gluing is required on valve bags, the structural strips are spot-pasted in sewn open-mouth bags to prevent shifting. Savings of 5-15 per cent of the cost of the bag have been reported by the company.

Polyethylene and pulp in diapers

A coating of polyethylene over soft, absorbent, non-woven fabric and fluffed cellulose pulp combines the function of both diaper and baby pants for greater comfort and convenience in a radically new type of disposable diaper. The diaper is said to have twice the water absorbency of the average cloth diaper.

Permanence of different pulps

While rag papers have been regarded traditionally as those of greatest permanence, experiments conducted by the Fibre Research Institute in Holland indicate that bleached sulfate pulps, especially those beached with chlorine dioxide, are equally durable. Some hardwood sulfate pulps showed remarkable permanence, while sulfite pulps were on the whole less permanent than sulfate pulps.

Idle time

The "ratio delay technique" is a simple method of estimating idle time. This method consists of counting the number of people who are idle and those who are working every time a tour is made through the mill. The average of these figures over a number of observations shows the proportion of working and idle time in the mill. The application of this method has shown that mills without a methods and incentive program may average as much as 20 per cent in idle time.

Couch roll noise muffled by changing the hole pattern

By changing the hole pattern on the couch roll in such a way that the sound wave (created when air rushes into the hole as the latter moves past the suction box) will collide with another sound wave and cancel each other out by a process of interference, Dr. George T. Thiessen of the National Research Council, Ottawa, has succeeded in designing a couch roll that emits only muffled sound. The required helical or spiral pattern of the 100,000 holes on the couch was achieved with the aid of an electronic computer. This new couch design promises to eliminate one of the most intensive noises in the paper mill.

Them's Mighty Strong Words,* Podner!

...sounds like you been through the mill!

• We've been through a lot of mills (paper mills, that is) —worked with them in running comparative, competitive tests in FLOTATION TYPE SAVEALLS. That's why we know we're on solid ground when we make this statement:

*** In the great majority of cases, one of DARLING'S specifically-formulated GLUES will reduce costs, while maintaining or improving flocculating efficiency.**

We'd like to work with you in making just such a test in your mill. The entire cost is on us. You've nothing to lose... plenty to gain. You can make arrangements through your Darling sales representative. Or write or call us collect.

DARLING'S improved BONE GLUE

• *You can get the same cost advantages from* DARLING'S *specifically-formulated* GLUE *used as an additive for improved* RETENTION!

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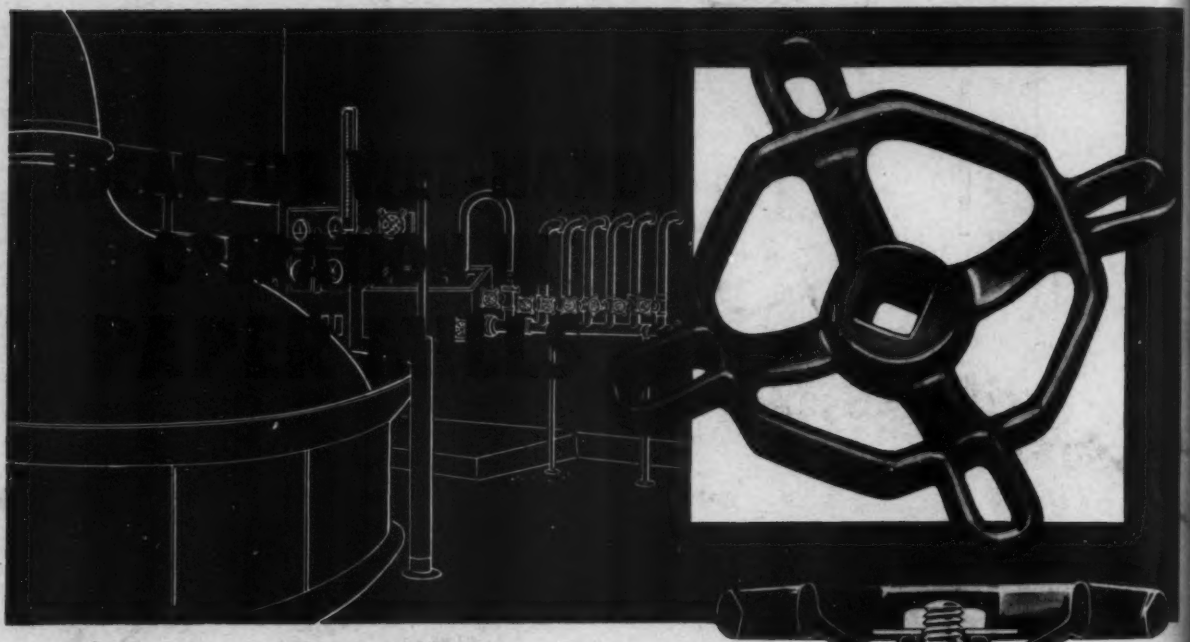


New non-slip® HANDWHEEL

Closes Lunkenheimer Valves Tight!

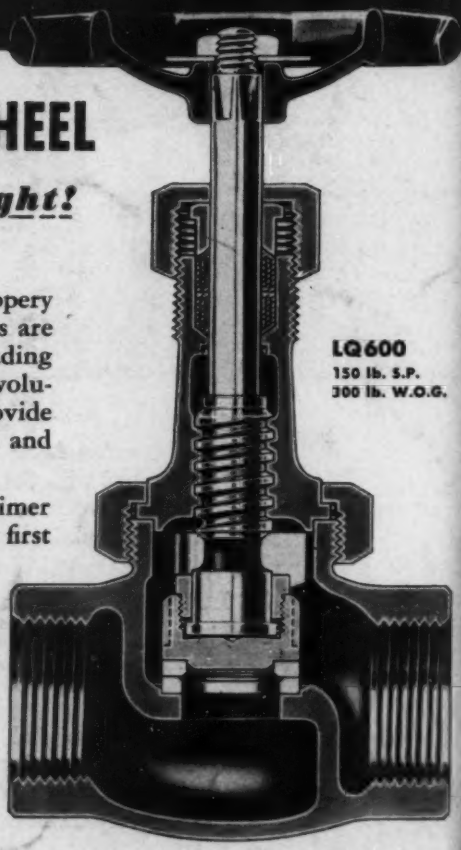
Where workers must operate valves with wet, slippery hands or rubber gloves, Lunkenheimer Bronze Valves are first choice. Engineers in many of the nation's leading paper mills specify Lunkenheimer because of the revolutionary Non-Slip Handwheel. Its rounded lugs provide a firm, comfortable grip that permits easy operation and tight closure even when hands are wet or greasy.

Now, there's even more reason to specify Lunkenheimer Valves. The new LQ600 Bronze Globe Valve is the first and only valve with Brinalloy*seats and discs that cut maintenance and replacement, even in the most severe throttling service. The exclusive new Stemalloy® Stem eliminates thread failure.

LUNKENHEIMER L QUALITY®

REQUEST the new Circulars describing the Non-Slip Handwheel and the new LQ600 Valve, from your local Lunkenheimer Distributor or from The Lunkenheimer Company, Box 360X, Cincinnati 14, O.

* *Patented Alloy*



LQ600
150 lb. S.P.
300 lb. W.O.G.

BRONZE • IRON • STEEL • PVC

The cost of a Lunkenheimer Valve gets smaller and smaller and smaller with each passing year of dependable service.

LUNKENHEIMER®

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